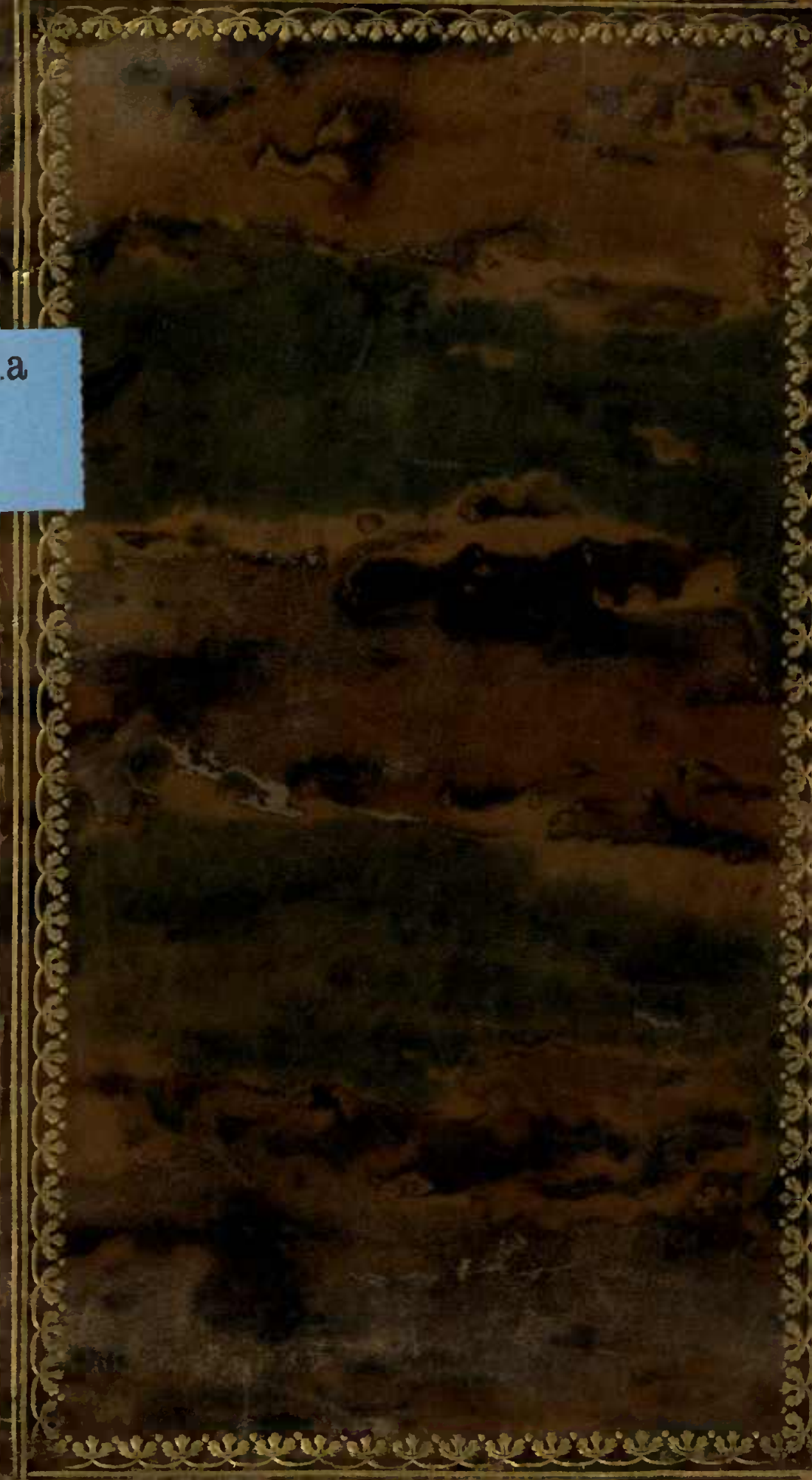

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REFLECTIONS

ON THE

WORKS

AND

PROVIDENCE OF GOD

THROUGHOUT ALL NATURE,

For every Day in the Year.

TRANSLATED FROM THE GERMAN OF C. C. STURM,

BY A LADY.

A NEW EDITION,

Carefully Revised and Improved,

BY THE REV. THOMAS SMITH.

IN THREE VOLUMES.

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REFLECTIONS

ON THE

WORKS OF GOD.

A Hymn of Praise to the Most High.

Sing with holy rapture unto the God of Heaven. Sing a new song unto the Lord of Hosts. Let us continually celebrate the praises of this Being, who is infinitely wise, infinitely good, and from whose piercing discernment nothing can be concealed.

He has stretched out the starry firmament, as a pavilion over our heads. There, surrounded by the radiance of innumerable suns, he has established his throne; there he dwells in light inaccessible to mortals.

Almighty God, I am lost in this splendor—this blaze of dazzling glory: but thou, in thy infinite goodness, art to be found every where, and art incessantly present with all thy creatures. Amazed at the wisdom of thy providence, and penetrated with grateful admiration, I praise and magnify thy sacred name.

Thou governest the earth with more than a father's care, thou enlightenest it by the sun,

waterest it by showers, and refreshest it by dews. At thy command it is clothed with smiling verdure, crowned with flowers, and enriched with luxuriant crops: and every year brings forward a renewal of its ornaments and its blessings.

Thy care extends to every thing that exists, and the minutest creature is an object of thy merciful attention. The young raven which, covered with snow, cries to thee from the summit of a barren rock, is fed by thy hand.

In obedience to thy sacred mandate, the cooling stream laves the bosom of the steril mountain; the sun invigorates the spreading vine, and ripens the fruit of our orchards; and the refreshing zephyr plays amidst the foliage of the shady grove.

When thou causest the sun to illumine the landscape by his cheering beams, he calls forth the creatures to their respective employments, and all is active in nature till the gloom and silence of night bring on the desired repose. But as soon as the morning again breaks forth, the choirs of birds pour forth their dulcet songs of grateful joy; all the nations of the earth, and all the zones under heaven, unite in a concert of praise.

Father of all beings! thou lovest all, thou crownest all with blessings, and offerest happiness to all men who desire to be happy. May thy name be celebrated in all the worlds which compose thy empire! May every voice unite in an universal song to that God whose wisdom is infinite, and whose goodness is unlimited!

SEPTEMBER I.

The Omnipresence of God.

THOU art present every where, O Almighty God! Thou art near; thou art afar off; thou fillest the whole universe. Here grows a flower, there shines a sun. Thou art in the wind, and in the tempest; in the light, and in darkness; in an atom, and in a world. Thou art present upon this flowery vale. Thou hearest my weak voice, as thou hearest, at the foot of thy throne, the sublimest songs which accompany the seraph's lyre. O thou, who art the God of the seraphim! thou art also my God: Thou hearest us both: thou hearest also the sprightly notes of the lark, and the hum of the young bee that flutters round the opening rose. Omnipresent Being! if thou hearest me, vouchsafe to grant my request. May I never forget that I am in thy sight; but, on the contrary, may I ever think and act as in thy immediate presence; that when summoned with the whole world of spirits before the tribunal of my Judge, I may not be obliged to flee from the presence of the Holy of Holies.

SEPTEMBER II.

The beauty and variety of Butterflies.

LET us examine these beautiful creatures whilst they yet enjoy their transitory existence: our ob-

servations may probably be equally interesting to the understanding and to the heart.

The first thing that excites our attention on beholding these inhabitants of the air, is the clothing with which they are adorned. Some of them, however, have nothing striking in this respect; their dress is plain and simple. Others have a few ornaments on their wings: but some have such a profusion, that they are completely covered with them. Let us reflect for a few moments on this last species. How beautifully are the shades variegated! How pretty the spots which set off the other part of their dress! With what delicacy has nature pencilled them! But, however great our admiration in seeing this insect with the naked eye, it will be greatly increased when we examine the beautiful object through a microscope.

Would any one ever have imagined, that the wings of butterflies were covered with plumage? Nothing, however, is more certain. What is commonly called dust, is found in reality to be feathers; and their structure and arrangement are as strikingly symmetrical as their colours are soft and brilliant. The parts which form the centre of these little feathers, and are next to the wing, are the strongest: those, on the contrary, which form the exterior circumference, are much more delicate, and of an extraordinary fineness. Each of these feathers has a quill at the base, but the superior part is more transparent than the quill from which it proceeds. If the wing be touched roughly, the most delicate part of the

feathers is destroyed; but if all the *dust*, as it is termed, be wiped away, nothing remains but a fine transparent skin, exhibiting the numerous little orifices in which the quills of the feathers were inserted. This skin, from the nature of its texture, may be as easily distinguished from the rest of the wing, as a fine lace from the linen on which it was fastened; it is more porous, more delicate, and seems as if embroidered with a needle. Lastly, it is edged with a fringe, the threads of which are extremely fine, and succeed each other in the most regular order.

What are our most elegant dresses in comparison with that which nature has given to this insect? Our finest laces are but coarse cloth, when compared to the delicate texture of the butterfly's wing; and our finest thread swells into hempen cord: such is the extreme difference observable in nature and art, when seen through a microscope. The former are finished in the utmost imaginable perfection; the latter, even the most beautiful of their kind, have no proper finish, and are coarsely made up. How very delicate does a fine cambric appear to us! Nothing more delicate than the threads, nothing more regular than the weaving; and yet, when viewed through a microscope, these fine threads resemble hempen strings; and we might rather be tempted to suppose that they had been interlaced by the hand of a basket maker, than wrought in the loom of a skilful weaver.

It is peculiarly worthy of remark, that this brilliant insect proceeds from a worm of the most

vile and abject appearance. Yet how beautiful is it now! and how much has it changed since the time when it grovelled in the dust, in continual danger of being trodden to death! See how it displays its sparkling wings, how it sports in the sun-beams, rejoicing in its existence, and fluttering from flower to flower! Who raised this creature above the earth? Who gave it the faculty of inhabiting the ethereal regions? Or who painted its wings with all the rich colours of the rainbow? It was the omnipotent God, its author and ours. In this extraordinary insect he has shown us an emblem of the transformation which awaits the righteous. A day will come, when, quitting this present form, they shall cease to grovel on the earth: when, holy and perfect, they shall be raised above the clouds; and, having nothing to obstruct their flight, they shall soar triumphantly beyond the stars.

SEPTEMBER III.

The growth of Trees.

EVERY tree, however luxuriant in branches and foliage, derives its principal nutriment from the bottom or root: and there is reason to believe that there is a circulation of juices in it, like that of the blood in animals. The exterior parts of the root are a prodigious mass of spungy fibres and globules of air, which are always open, in order to be filled with the juice they receive from the earth.

This juice is at first nothing but water, loaded with earthy matter; then, by means of a sort of milky substance, which is peculiar to each tree, and distinguishes it from any other, the juice acquires a nutritive quality before it rises to the parts of the tree which are above the surface of the ground. It is found by the microscope, that wood, notwithstanding its hardness, is nothing more than a collection of an infinite number of little hollow fibres. Most of them, particularly in shrubs, rise perpendicularly; but, in order to give more consistency to these fibres, there are in certain trees, especially such as are designed to be strong and hard, stalks which extend horizontally from the circumference of the centre. Drawn by the heat of the sun, the juice gradually rises into the branches and into all their external parts, as the blood which flows out of the heart is conveyed through the arteries to the extremities of the animal body. When the juice has been sufficiently diffused through all the parts where it was necessary, what remains ascends by certain large vessels, placed between the outward and inner bark, in the same manner as the blood returns back through the veins. From this results a growth which renews every year, and causes the tree to grow thick. To be convinced of this, we need only cut a branch across to ascertain the age of the tree. Whilst the stem grows higher and higher, the root at bottom increases in the same proportion. As for the outer bark, it seems intended to serve in some measure as a sort of coat for the tree, to unite the compo-

nent parts closely together; and to preserve the tender, though essential parts from accidents, and from the intemperature of the air.

It is thus that the wise Creator has formed an admirable system of solids and fluids, in order to give life and growth to the trees which adorn the country; which give shade to our flocks, our shepherds, and hamlets; and which, when cut down, serve so many purposes useful to mankind. Here we discover a wisdom which is never mistaken, which prescribes to nature laws in some respects immutable, and which act without interruption under the eye of Providence. A wisdom so profound, an art so wonderful, so many preparatives and combinations for each tree, ought to lead us to revere and admire more and more the creative hand. The contemplation of such wisdom is a noble study; and should animate us to glorify God, so great in his counsels and plans, and so wonderful in their execution. The more we discover the traces of Divine Providence, the more should we be induced to commit all our concerns unto Him who can never want means to turn every thing to the advantage of his creatures. Finally, we should be encouraged to raise our affections toward him, and to supplicate him to enrich our souls with the gift of wisdom, and to make them grow in grace.

In our progress through life may we resemble a flourishing tree. As this from year to year puts forth new shoots toward heaven, and extends around it fresh branches laden with verdant foliage and nutritious fruits, may we incessantly

grow up in all righteousness, and bring forth fruit acceptable to God, and suitable to the capacity which he has given us. May our souls be strengthened in holiness, established against all the storms of life, and deeply rooted in humility! And when approaching the limits of our present existence, may we never find the emblem of our state in an old tree, which, in proportion to its age, always attaches itself more strongly to the earth.

SEPTEMBER IV.

The Ant-Lion.

No insect is more famous for its dexterity than the ant-lion, although its form promises nothing extraordinary, nearly resembling that of the woodlouse. It has six feet; and its body, which is composed of several membranous rings, terminates in a point. Its flat square head is armed with two moveable hooked horns, the singular construction of which shows how admirable nature is, even in her smallest works.

This insect is the most cunning and dangerous enemy the ant has; and the plans which he forms to catch his prey are truly ingenious. He undermines a piece of ground in the shape of a funnel, and waits at the bottom to draw down any ants which may chance to come to the brink of this precipice. The method of digging it is, first, to trace a circular ridge in the sand, exactly the

size of the funnel, the diameter of which is always equal to the depth he chooses to make it: when he has fixed on the size of this opening, and traced the first ridge, he immediately digs a second, concentric to the other, in order to throw out all the sand enclosed in the first circle. All these operations he performs with his head, which serves instead of a shovel; its flat and square shape rendering it exactly fit for the purpose. He also takes up sand with one of his fore feet, and throws it over the first ridge, and this he repeats till he has got to a certain depth in the sand. When, in digging, he meets with grains of sand larger than usual, or with little bits of dry earth, which he will not suffer to remain in his funnel, he gets rid of them by a quick and well-timed motion of his head. If he find still larger pieces, he endeavours to push them away with his back; and he is so earnest in his labour, that he repeats it six or seven times.

At last the ant-lion comes to enjoy the fruit of his toils. His traps being properly prepared, he puts himself on the watch, and, concealed at the bottom of the ditch which he has dug, he patiently waits for the prey which he cannot pursue. If an ant approach the brink of the precipice, she seldom fails of falling to the bottom, because the edge is sloping, and the loose sand, which gives way under her feet, draws down the insect into the power of the enemy, who drags her with his horns under the sand, and feasts upon her blood. When he has sucked all the juices from her body, he throws the dry carcase out of his habitation,

repairs any damage his trench may have sustained, and puts himself in ambush as before. He does not always succeed in catching his prey the moment it falls. It often escapes him, and endeavours to run up again to the top; but then the ant-lion works with his head, and causes a shower of sand to descend upon the ant, which drives her down again into the hole.

All the actions of this little animal exhibit such wonderful art, that we might repeatedly examine them without being wearied. The ant-lion employs himself in preparing his trench, before he has even seen the insect destined to become his food, and yet his actions are so regulated, that they prove the surest means of providing for his subsistence. How could such an inactive creature as this catch his prey so well as by digging in loose sand, and giving a sloping form to the hole he makes, and then covering with a shower of sand the insect which falls into it? All his actions have fixed principles by which he is directed. His ditch ought to be dug in the sand, or it would not be adapted for entrapping his prey. According to the make of his body he is obliged to work backwards, and to make use of his horns as tongs to throw up the sand to the edge of the funnel.

The instinct which directs this insect, discovers to us a First Cause, whose foresight knew and ordained all that was necessary for the preservation and welfare of such an animal. The dexterity which he exhibits is not the effect of experience or practice: but was born with him. We

must, therefore, seek its origin in that great Being who proportions the instinct of animals to the different degrees of their wants.

These reflections should lead us to the Creator of all things, the Source of life, who loves to diffuse it every where. He has formed even this insect so as to make its existence a blessing to itself; and by its instinct (however limited in some respects) he has endowed it with an ingenuity approaching to, and in some measure surpassing, reason. His design in this has evidently been to furnish us with opportunities of knowing him; consequently, every insect, however insignificant, ought to raise our thought to God who has created the worm as well as the elephant, and who extends his cares equally to both.

SEPTEMBER V.

Conformity between Plants and Animals.

It is more difficult than we imagine, to distinguish the specific difference between plants and animals. It is by imperceptible degrees that nature descends from animate to inanimate beings, and it would require the penetration of an archangel to distinguish these degrees exactly. But we may remark, that with all the differences found between these two sorts of organized bodies there still remains much resemblance.

The *seed* is to the plant, what the *egg* is to the animal. From the former springs a stalk which

had been concealed under the coats of the seed; and this stalk makes an effort to rise out of the ground. In like manner the animal enclosed in the egg, pierces the shell in order to breathe the open air. The *eye* or bud of the tree is, in the vegetable kingdom, what the *embryo* is to the animal. The eye does not pierce through the bark till it has come to a certain size, and it remains attached to it, in order to receive nourishment from it, as well as from the fibres of the plant. The embryo at the expiration of a certain time comes from the womb; but even then it could not long subsist if it were not nourished by its mother. The plant feeds on nutritive juices, which are brought to it from without, and which passing through different channels, at last change into its own substance. The animal's food has the same course and progress. Plants are multiplied not only by seed and by ingrafting, but also by slips. It is the same with animals: they multiply not only by laying eggs, or by bringing their young alive into the world, but also by slips, as we observe in the polypus. The disorders or maladies of plants have either external or internal causes, as is the case with animals. Lastly, death is the common lot of both, when old age, having dried up and obstructed the vessels, stops the circulation of the juices. Plants and animals inhabit the same places. The surface and interior of the earth, the air, the sea, and the rivers are filled with them; and both are extremely numerous, though animals rather than vegetables seem to bear the preponderance.

Thus one might be tempted to believe, that animals aud plants were beings of the same class, since nature appears to pass from one to the other by imperceptible gradations. It is very certain that some general and essential resemblances have been found in the two kingdoms; but the truly characteristic differences have not hitherto been clearly ascertained. And though some should be discovered which have not yet been observed, it is still certain that nature varies her works by such nice shades that the human understanding can with difficulty discern them. Who knows what discoveries may be reserved for our posterity? Perhaps plants may hereafter be known with properties still more like those of animal bodies; and perhaps animals may be found out still nearer the class of vegetables than the polypus.

Let us make that use of these discoveries for which all the truths of nature and revelation are designed; viz. to draw from them continual incitements to glorify God, and to strengthen our minds in virtue. Let the great resemblance between plants and animals make us sensible of the power and wisdom of that Being, who has in some measure impressed a character of infinity on all creatures. But, O man! learn also to be humble Thou partakest of the nature both of the plant and animal. And to the blessed Jesus thou art indebted for the privilege of being placed between brutes and angels. Endeavour by a righteous life to resemble those celestial spirits; and as it is granted thee to bear some resemblance to the Cre-

ator of all things, pray incessantly for that grace which alone can fit thee for the kingdom of glory.

How wonderful is that creature who, like the brute, draws his nourishment from the earth, and yet, like the angel, raises his thoughts to heaven; a creature of which one half perishes like the brute, while the other half lives and is immortal; ordained to become holy and perfect; to be free, and yet subject to God!

SEPTEMBER VI.

The Nature and Properties of Sound.

ALL sounds are produced by means of the air; but it is necessary for this purpose that the air should be put in motion. It is not that every movement of the air occasions a sound; for, if this were the case, all wind must be attended by a noise. To produce a sound, the air must be suddenly compressed; and must dilate and expand again by its elastic power. This occasions a kind of trembling undulation, something like that of the waves and circles occasioned by throwing a stone into the water. But if this undulatory motion were only to be effected by the particles of air being compressed, the sound would never reach our ears. It is therefore necessary that sonorous bodies, after making impression on the contiguous air, should continue that impression from particle to particle in a circular direction to all parts.

By this means the particles of air reach our ear, and we have a perception of sound. This progress is made with prodigious velocity. Sound travels a thousand feet in a second of time, and consequently a German league in twenty seconds. This calculation, which has been proved by many experiments, may be useful in several cases. The knowledge of it contributes to our security, in teaching us how far thunder is distant from us, and consequently apprising us of our safety or danger in the place where we hear it roll. We need only count the seconds, or the beating of each pulse between the flash and the clap, to ascertain exactly the distance we are from it. By the same means we may calculate the distance of places, and that which separates two vessels.

It is very remarkable that a weak sound propagates itself with the same velocity as one that is much stronger. The agitation of the air, however, is greater in proportion to the strength of the sound, because a larger mass of air is put into motion. The sound is therefore loud when many particles of air are put in motion, and weak when confined to a few.

But of what use would these philosophical observations be, if our bodies were not so formed as to afford us the perception of sounds? Let us therefore bless God, not only for having disposed the air in such a manner as to produce sound by its vibration, but for giving us organs capable of receiving sonorous impressions. A thin elastic membrane stretched at the bottom of the ear,

like the skin over a drum, receives the vibration of the air; and by that means we have the power of distinguishing all sorts of sounds. Thus far our knowledge reaches. But if we inquire how it is, that when we pronounce a word, it creates in us the idea of a *word*, and not a mere sound, or how a tone can act upon our souls, and produce so many different sensations, we are obliged to acknowledge our ignorance. It is enough for us to be convinced by this, as by every thing else, of the wisdom and goodness of our Creator. If there were no sounds, all mankind would be dumb, and we should be as ignorant as a child before it can speak; but by means of sounds, every creature can express its wants and its enjoyments. Man has, in this respect, great advantages: he can express the sentiments of his heart, and even excite the passions, by certain tones of his voice. God has not only conferred upon us the faculty of distinguishing sounds by the organ of hearing, but he has also furnished us with other means of preserving this blessing: if one ear should be hurt, the other may do its office; and a man whose hearing is imperfect, may make use of a trumpet; even when the external auditory pipe is injured, the internal one next the mouth may remain unhurt. It must also be observed that the Creator has vouchsafed to make this a circumstance of pleasure to us: a number of musical instruments amuse and delight us; our auditory nerves transmit to us, with great exactness, the tones of an infinite number of sonorous bodies. When we reflect

on this favour, our grateful hymns ought to reach as far as sound itself. The whole universe should resound with praise to our heavenly Benefactor.

SEPTEMBER VII.

The Mysteries of Nature.

When men attempt to investigate things, and to penetrate into the causes of effects which come under daily observation, they are obliged to acknowledge how limited and weak their understandings are. The knowledge we have of nature, and of which we are sometimes so vain, scarcely extends any further than to a superficial acquaintance with the effects of a few things which fall immediately under our notice, and which we apply, in a certain measure, to our advantage. But to ascertain the causes of these effects, or to discover how they operate, is generally a task too difficult for our finite faculties. Thousands of effects in nature are concealed from us; and those which we are able to explain, have still some obscurity in them, which reminds us that we are but men. There are many phenomena, the near causes of which are unknown to us; several are doubtful; and there are very few of which we can be certain. We hear the wind whistle; we experience its great and various effects; but we know not exactly what produces it, what increases it, or what abates its violence. From a small seed we see a plant spring up with stalks and ears; but we

know not how this is effected. As little can we comprehend how a small kernel can produce a tree, in the branches of which the birds build their nests; which clothes itself with leaves and blossoms to shade and refresh us; and which affords fruit for our nourishment, and wood for our various wants and conveniences. All the aliments we use, which are so very different in their nature, are, by an incomprehensible process, transformed within us into one substance, which assimilates to our flesh and blood. We behold the wonderful effects of the loadstone, and we believe there must be a certain matter which operates in it; but whether it acts by an attractive force peculiar to itself, or whether it is a sort of fluid perpetually circulating about the loadstone, or whether it forms a kind of vortex, is what we cannot decide.

We feel the cold; but no natural philosopher has yet discovered what occasions it. We are better informed than our ancestors were in respect to thunder; but of what nature is that electrical matter which shows itself so terrible in storms? We know that the eye observes the images painted on the retina, and that the ear has a perception of the vibration of the air; but whence is perception, and how is it caused? We are conscious of the existence of a soul in the body; but who can explain the union of soul and body, or their mutual influence on each other? The effects of fire and air are continually before us; but who is intimately acquainted with their nature, their integral parts, and the manner

in which their different effects take place? In a word, in respect to most things we have no certain principles, but are reduced to conjecture and probabilities. What are all the hypotheses of philosophers, but tacit confessions of their limited knowledge? Nature at every step presents wonders which confound us; and whatever researches, whatever discoveries we have made, there still remain a thousand things which we cannot comprehend. It is true, we are sometimes able to give happy explanations of certain phenomena; but the principles, the first springs, their nature and manner of operating, are certainly above the sphere of our understanding.

The mysteries of nature afford us daily lessons of wisdom in regard to the mysteries of revelation. In nature, God has placed within our reach the means of passing our temporal lives happily, although he has concealed the causes from our sight. Thus, in the kingdom of grace, he furnishes us with means of arriving at a spiritual and everlasting life, though the manner in which they operate remains concealed from us. Will any one refuse to eat and drink, till he knows how food can give strength, and preserve life? Will he refuse to sow or plant, till he obtain a clear idea of the nature of vegetation? Or will he refrain from making use of wool, till he can ascertain the manner in which it was formed? Man does not push his extravagance so far: on the contrary, he observes the productions of nature; experience proves their utility: and he enjoys them with gratitude to his Creator. But why do

not men act as wisely in regard to the mysteries of religion? They dispute about the means of salvation, their efficacy, and their manner of operating; but they forget to make the salutary use of them for which they were intended. O that we were as wise in spiritual as in temporal things! Instead of giving ourselves up to vain and useless speculations, let us avail ourselves of the means of grace which God has afforded, and let us faithfully use them. For *this* purpose they were granted to us, and not that we should search curiously into their nature and manner of operation. If we find things which we cannot comprehend or thoroughly know, let us receive them with humility, and acknowledge the weakness of our understanding. The advantage we derive from a proper use of them, ought to convince us that they are the work of a Being infinitely wise and beneficent.

God forbid that we should be presumptuous enough to flatter ourselves with a thorough knowledge of the mysteries of nature and of religion; or rash enough to dare to criticise and blame what we cannot comprehend. Let us rather acknowledge the weakness of our understanding, and the infinite greatness of God. Thus, each mystery will lead us to adore that Almighty Being whose works are so wonderful, and far above our comprehension.

SEPTEMBER VIII.

The Eyes of Animals.

THE mere consideration of the eyes of different kinds of animals, is sufficient to convince us of the wisdom with which God has formed the bodies of his creatures. He has not given to all the same organs of sight, but has diversified them according to their different natures. Suitable reflections on this subject will afford us one of the noblest pleasures of which the human mind is capable.

The eyes of most animals appear round: but there is, even in this spherical figure, a great variety. Their situation in the head, where they are near the brain, which is the most sensible part of the system, is liable to great differences. Man, and most quadrupeds, have six muscles attached to each eye, in order to move it on both sides. The position of the eye is such, that they see straight before them, and describe almost a semicircle. But here already we find a diversity. Horses, cows, sheep, hogs, and most quadrupeds, have a seventh muscle to suspend and support the eye-ball: which is necessary to them, because their head and eyes incline towards the ground while seeking their food. The eyes of frogs differ from ours; as they can cover theirs with a membrane, which is transparent, though of a sufficiently close texture. This defends their eyes, and guards them from those dangers to

which they would be otherwise exposed, by living sometimes in water, and sometimes on land. Flies, gnats, and other insects of a similar nature, enjoy more perfect sight than other creatures: they have almost as many eyes as they have apertures in their cornea. While other animals which have only two eyes, are obliged to turn them, by means of muscles, to every object, flies can see distinctly on all sides, without having the trouble to turn their eyes; because some of these are naturally and constantly directed to the objects around them. Fish, which live in an element more dense than ours, would not be able to see, but would be blinded by the strong refraction of the rays of light, though they have well-formed eyes, were not the crystalline humour almost spherical, the better to collect the rays of light. They have no eye-lids, and they cannot draw back their eyes; but their cornea, which is as hard as horn, sufficiently defends them from all danger. Formerly the mole was supposed destitute of sight; it is however certain that it has two little black eyes, though not larger than the heads of pins. As this animal is generally under ground, it was necessary that its eyes should be very small, sunk in the head, and covered with hair.

The eyes of snails are placed at the end of two long horns, and they have the power to draw them in, or to raise them above their heads to discover distant objects. In some animals which can neither move their eyes nor heads, this defect is compensated either by a multitude of eyes, or

in some other manner. Spiders have from four to six, and sometimes eight eyes, all placed on the front of a round head, with no neck. They are clear and transparent as diamonds. According to the way of life, and the different wants of some sorts of spiders, these eyes are differently placed; so that without moving their heads, they may on all sides see the flies destined to be their food. The cameleon, a species of lizard, has the singular property of moving one of its eyes while the other remains motionless: of turning one up to the sky, and looking on the ground with the other; and of seeing what passes before and behind at the same time. The same faculty is observed in some birds, and in hares and rabbits, whose eyes are convex; and this property saves them from many dangers, and enables them to find out their food more easily.

These remarks, which might be easily multiplied, evidently mark the tender care of Providence for the preservation of the most necessary organs. God has communicated the blessing of light to his creatures in different ways, and we are struck with astonishment when we consider the wonderful art displayed, and the precautions taken to preserve the possession of this precious organ, and to defend it from the dangers to which it might be exposed.

All the parts of the bodies of animals are disposed in the most exact proportion, and in a manner the best adapted to their different designs. The situation of the eyes, their form, number, and arrangement, could not have been

different in any creature without occasioning various inconveniences. It was not only for ornament, but for the benefit of animals, that the Creator so varied the construction and position of their eyes. And, undoubtedly, one of his views in this was to teach us to acknowledge and praise his wisdom in all things. Let these reflections lead us to acknowledge the wisdom of God.

SEPTEMBER IX.

Fish.

Who that had never seen fish would have believed that such creatures existed? If a naturalist only knew animals that walk and breathe on land, and were told that there were creatures in the water, so formed as to live, move, multiply, and fulfil every animal function in that element with ease and pleasure, would he not treat it as a fiction, and conclude, from the effect on our bodies when plunged in water, that it must be absolutely impossible to live in that situation?

The way in which fish live, their construction, motions, &c. are truly wonderful, and afford fresh proofs of the omnipotence and infinite wisdom of our sovereign Creator. To enable these creatures to live in water, it was necessary to form their bodies, in essential points, very different from those of land animals; and we accordingly find this the case in fish, both with regard to their external and internal structure.

Why has the Creator given to most fish a

slender thin body, flattened at the sides, and always pointed at the head, if it were not that they should swim, and cut their way better in the water? Why are they covered with scales of a horny substance, if it be not to preserve their bodies from being hurt by the pressure of the water? Why are several sorts of fish, particularly those without scales, enveloped with a fat and oily substance, if it be not to preserve them from injury, and to guard them from cold? Why are the bones of fish so different from those of other animals, if it be not to make their bodies more flexible and light? Why are the eyes of fish sunk into the head, and why is the crystalline humour spherical, but to guard them better from being hurt, and to make them take in more light? It is evident, that, in the formation of all those parts, the Creator has considered the way of life and destination of these animals.

But there are still more wonderful circumstances in the construction of these creatures. The fins are almost their only limbs; yet these are sufficient to perform all their motions. By means of the tail-fins, they move forward; the back-fin directs the motion of the body; they raise themselves by the breast-fin, and that of the belly serves to balance them. The gills, situated behind the head, are the organs of respiration. There are four on each side, the uppermost of which are the largest. They are continually swallowing water through their mouths, which is their drawing in of breath, and they cast it out through their gills, which is their way of breath-

ing out again. The blood which comes from the heart, and flows into the veins of the gills, does not return back to the heart through the lungs, as in land animals, but is directly dispersed throughout all parts of the body. One of the organs most necessary to fish in swimming, is the air-bladder, which is included in the belly, and communicates with the stomach. By means of this bladder they can make their bodies lighter or heavier as they please. When this vessel is inflated they become lighter, ascend, and swim near the surface of the water: but when it is contracted and the air compressed, their body becomes heavier, and they sink in the water. Thus, if this bladder be pricked with a pin, the fish sinks at once to the bottom, and can no more raise itself to the surface.

The prodigious quantity of fish, with the great variety of shape and size, is highly worthy our admiration. In Germany alone there are above four hundred kinds of fish, and who can count the numbers in each species? Their external form is also greatly varied. The very largest, as well as the smallest of animals, are to be found amongst fish. Some are long, and small as a thread; others short and broad. Some are flat, others cylindrical, triangular, round, &c. Some are armed with a horn, some with a sort of sword, and others with a kind of saw. Some have nostrils through which they eject the superfluity of water they have swallowed.

Which ought we most to admire in all this: the power and wisdom of the Creator, in forming

and preserving these animals, or his goodness in giving them for our use? The whole must lead every attentive observer of the works of God to magnify his name. What greatness appears in all the elements, and in all the animals, whether they inhabit the air, the earth, or the sea! in the whale, whose back is like an island in the midst of the ocean; and in the gold fish, which glitters in the streamlet!

SEPTEMBER X.

The Motions which belong to the Human Body and Mind.

THERE are three sorts of motions which all persons may observe in themselves who turn their thoughts to the subject. *First*, those that tend to the preservation of the human frame, such as the motion of the heart, the circulation of the blood, the action of the stomach in digestion, the working of the bowels, nourishment, and growth. Of the action of these vital parts every one is wholly ignorant; not the least consciousness can be pretended of how we live; only when the machine is any way disordered, there is generally some notice given by pain or uneasiness. The *second* sort of motions are those which we seem, as free agents, to have the command of, but over the *performance* of which we are conscious we have no power or direction. Such are all external motions, as walking sepaksing, handling, &c.

Here the action follows our wish or will; but *we* cannot be said to direct the muscles, joints, &c. as most of us are wholly ignorant how the action is performed. Of this we have a remarkable instance in taking aim at any thing; for the hand, at the command of what is called the *will*, does precisely for the most part follow the direction of the eye, and strikes the part intended, though we know not how. And even those actions which seem at *first* to be directed by the will, may at *last* be performed by a mechanical habit; so that a whole band of musicians may be brought to play on different instruments, without attending to the notes; and a vast variety of motions may be regularly performed, but not by the power, nor even by the direction of the performers. The *last* sort of motions are those which are excited by our affections and passions; for *these* are as really felt by the body, as pain externally applied; and they express themselves likewise on the body by outward signs. But over these again, that thing called *self* has no power to excite them; but certainly seems at least to have that of choosing or refusing, of concealing or repressing them in some degree; and there is in each individual a consciousness at least of their *existence*, as well as of his power to perform the former motions whenever the machine is in a state to act. If any one will say that 'the whole is a mechanism, and that matter may think,' it is not in my power to convince him. I allow there is something mechanical, some connexion with the body in every operation of the mind; but still

there is besides a *something* that I must call *self*, which receives the impressions of the senses; which distinguishes pleasure from pain; which chooses the one, and rejects the other; which is *conscious*, in short, of its own existence, and conscious also that it exists not of itself. This, however, though it be in every man, is not attended to by all; nay, probably would not have been attended to by any, if divine revelation had not taught man to think. The great argument of the materialist is, that he who is supposed to act with freedom of will, is supposed to act without a motive; but this I beg leave to deny. There is a motive in every man, viz. the desire of happiness, and consequently of existence. I cannot see any right we have to think that the Almighty cannot give every one power to choose as to the means of happiness, whether to seek it in present enjoyments, or in future hopes; in living in obedience to divine wisdom, or in the gratification of gross appetites. In the first kind of motions before mentioned, I see a proof of great goodness in the Supreme Being, in not having left my preservation to myself. In the second, I feel the power, and see the wisdom and goodness of God, in making me sensible of a continual dependence on him; and in his performing by me such things as I could not do without a degree of knowledge, and a multiplicity of attentions, which would make me a very *different*, and, I suppose, a less *happy* being than I now am. As to the last kind of motion, viz. that excited by our passions, it seems evident, that it is more worthy of the divine

wisdom to be served by moral agents, than by those whom necessity directs; and I therefore believe we have a power to regulate our passions, and check, in some degree, this third kind of motion. I think then I see a reason for the three distinct sorts, which every one must be conscious do exist in fact, allowing a freedom of will. But if the whole be guided by necessity, I cannot see any reason for these different appearances, especially for the fallacy which must be naturally imposed upon the greatest part of mankind, and that without any advantage to be obtained by it: I mean the idea of being free agents, which seems to force itself upon us. I think there is still another thing worth observing, as to the motions that concern preservation, which is the uneasy sensations that attend the least disorder in that first set of motions. For these sensations seem to call for help: but to whom do they call, if not to that same *self*, *i. e.* the human *soul?* If any thing happen to the exterior parts of the body, the second sort of motions immediately afford relief. The eye-lids shut mechanically; the hand moves to a part that is hurt; the body springs when in danger of falling; but the palpitation of the heart, or a pain in the stomach, finds no mechanical relief. It calls upon the understanding and will to provide a remedy, and therefore necessarily points out the existence of such faculties, and a being in whom they exist; but if no such being exist, and all be mechanical, how can we account for the divine wisdom, in providing two different ways of acting on that same

thinking machine, where one would have been sufficient?

SEPTEMBER XI.

Influence of the Moon on the Human Body.

CERTAIN influences were formerly ascribed to the moon, tending to nourish superstition, and excite groundless fears. The gardener would not plant till he had made observations on this planet; and the husbandman deferred sowing till he was assured of its benignant influence. Sick persons paid the most scrupulous attention to the changes of the moon, and even physicians regarded them in all their prescriptions. As knowledge became more generally diffused, however, these prejudices began to subside, and the influence of the moon is no longer considered so powerful and universal an agent in nature as was formerly imagined. This is one of the many advantages the present age has over the last:—an advantage which, however little considered, merits our warmest gratitude to God. It is our indispensable duty to render this still more extensive; and to exert ourselves, as much as possible, to extirpate ancient superstitions.

With regard to the influence of the moon on our bodies, the safest way is to preserve a medium: for, as it would be irrational to attribute to that planet too great a power over the human frame, so it would be no less rash to deny it any.

It must be allowed, that the moon occasions great changes in the air, and, of course, may produce several alterations in our bodies. The moon causes such considerable alteration and motion in the higher atmosphere, as to occasion earthquakes, winds, heat, cold, vapours, and fogs; and on this account, the health of our body will, in a great measure, depend on the influence of the moon. It is observed in persons, who have certain infirmities, that they relapse, or suffer most acutely, at the time of new and full moon. This is not surprising; for if it be true, that cold, damp, cloudy, and stormy weather have a different effect upon our health, from a warm, dry, pure, and serene air, the moon must have considerable influence on the animal frame, since it produces so many changes in the temperature of the atmosphere. The power this planet has over the human body is founded on an undeniable principle, which is, that our health greatly depends on the weather, and the sort of air we breathe; and it is certain that the moon causes many alterations in the atmosphere. Perhaps there may even be a flux and reflux in the human body, occasioned by the moon, like that in the air and sea.

Why do most periodical diseases return at the end of four weeks, rather than at a longer or shorter period, if it be not owing to the effect of the moon upon the human body?—In general, it is a principle we ought to admit, to the glory of our wise Creator, that throughout all natural things there are certain connexions which in-

fluence in different ways the animal economy. There are, without doubt, many wonders in the atmosphere still unknown to us, which cause many considerable revolutions in nature. Who knows if some of the phenomena of the corporeal world, which we do not think of, or which we attribute to other causes, may not depend on the moon? Perhaps the light it affords us in the night is one of the least of the purposes for which God formed this planet. Perhaps its being placed so near our earth was to produce certain effects on us, which the other celestial bodies, from their distance, could not do. It is at least certain that every thing in the universe has some relation with our globe; and this is precisely what renders the world a master-piece of divine wisdom. The beauty of the universe consists in the diversity and harmony of its component parts; in the number, nature, and variety of their effects; and in the sum of happiness resulting from all these combinations. How then can the influence of the moon or stars create superstitious fears in our minds? If we believe that it is God who has planned every thing, and who has fixed the connexion between all these globes, how can we encourage vain terrors so contrary to the idea we ought to form of divine wisdom? If we be really persuaded that this great Being governs all things with infinite wisdom and goodness, is it not natural to trust to him, and to rest with joy and tranquillity upon his good providence?

SEPTEMBER XII.

The Ignis Fatuus.

THE Ignis Fatuus is a little light flame which plays in the air only a few feet from the ground, and appears to go hither and thither at random. This fire frequently seems to disappear, and go out suddenly, probably when shrubs or bushes hide it from the sight; but it is soon rekindled in some other place. These meteors are seldom seen in cold climates; and in winter they only appear in wet and marshy lands. In Spain, Italy, and other hot countries, they are met with in all seasons, and are neither extinguished by wind nor rain. They are also frequently seen where there are putrid plants, or animal matter, as in church-yards, shores, and rich and marshy ground.

Too few experiments have been made on these sort of ethereal fires to determine precisely as to their nature. But the places where they are generally seen may give rise to probable conjectures; for as they scarcely ever appear but in marshy countries, it is natural to suppose that they are ignited sulphureous exhalations. It is known that carcases and rotten plants sometimes emit light. Perhaps vapours condensed by the cold of the night take the appearance of the Ignis Fatuus: or it may be the effect of a slight electricity produced by the interior motion of the vapours which rise in the air. Horses, dogs,

cats, and even men, may become so electric as to emit sparks of fire when they are rubbed, or put in motion in a particular way. May not this be the case with some parts of the earth? A field in some circumstances may be electrified in some parts, and then it is not surprising that it should appear luminous. Even the air may occasion the Ignis Fatuus, when it is electrified to a certain degree.

If the manner in which these phenomena is produced be still doubtful, we are certain, at least, that it proceeds from natural causes, and, consequently, are not obliged to have recourse to superstition. Superstitious people look on these flames with such terror, that few have courage to approach them. They think they are departed souls, or wicked spirits, which wander about, and take pleasure in leading travellers astray during the night. What may have given rise to this superstitious idea is, that the Ignis Fatuus follows all the motions of the air, and thus flies from those who pursue it: and, on the contrary, follows those who try to avoid it, and fixes on carriages which go swiftly. But the reason of these phenomena is very evident; for the person who pursues this flame drives the air, and consequently the fire, before him; whereas he who flies leaves an empty space, which the ambient air fills up continually. This produces a current of air between him and the fire, and of course draws it after him. This is the reason we observe it to stop when the person ceases to run.

How many people torment themselves with

terrors and alarms which have no other ground than a disordered imagination! And how easily might these be avoided, if they would but *examine* the objects which frighten them, and investigate their natural causes! Nearly the same thing happens in a moral sense. With what ardour do men pursue the goods of fortune, without examining whether they merit such anxiety, or can afford the happiness expected from them! Most ambitious and covetous people may be compared to a man running after the Ignis Fatuus without ever being able to catch it. What do they gain in the end by their continual exertions to obtain riches, which, both in their nature and duration, resemble this uncertain flame? Terrestrial good generally flies from him who pursues, and falls to the lot of those who seem to avoid it.

SEPTEMBER XIII.

On Minerals.

In order to provide themselves with wholesome and convenient dwellings, mankind require many materials. If these had been spread over the surface of the earth, it would have been entirely covered with them, and there would not have been sufficient room for animals and plants. Our earth is happily free from such encumbrance; and its surface is left to be cultivated and traversed by its inhabitants without any hinderance. Me-

tals, stones, and a hundred other things which we continually use, are shut up in vast magazines under our feet, where we may find them whenever we want them. They are not concealed in the heart of the earth, nor at an inaccessible depth, but are purposely brought near the surface, and placed under a vault, which is both thick enough to produce our food, and thin enough to be dug through when we find it necessary to take out some of the numberless materials provided in it for the use of mankind.

All the substances in the mineral kingdom may be divided into four classes; each having its distinguishing characteristic. The first includes *earths*, substances which cannot be dissolved by water, fire, nor oil, which are not malleable, and bear the action of the fire without losing any of their substance. This class, besides the simple earths, includes the stones which are composed of them. There are two sorts of stones, the precious and the common. The latter are very numerous, and present themselves to us in masses different in form, size, colour, and hardness, according to the earth, sulphur, &c. of which they are composed. Precious stones also exhibit great variety. Some are perfectly transparent, and appear to be the most simple: others are more or less opaque, according as they are composed more or less of heterogeneous particles.

Salts form the second class in the mineral kingdom. They include those bodies which are soluble in water, and which leave a relish on the tongue. Some are liquefied in the fire, and

others remain in it unaltered. They are divided into acids, which are sharp and sour, and into alkalies, which impart to the tongue a bitter, acrid, and lixivial taste. These have the property of changing vegetable blues into green, as acids convert blue into red. From an exact and proper mixture of these two salts with each other, *neutral* salts are produced; such as the common kitchen salt, which is either taken out of the earth, prepared with sea-water, or obtained by the evaporation of brackish water in great caldrons. All these salts together form one of the chief causes of vegetation. They possibly serve also to unite and strengthen the parts of plants, as well as all the other compound bodies. Lastly, they occasion fermentation, the effects of which are so numerous and so different.

The third class of minerals comprehends *inflammable* bodies, to which are given the name of *Bitumens.* They burn in the fire, and when pure they dissolve in oil, but never in water. They are distinguished from other minerals by containing a greater portion of inflammable matter, which renders those bodies, in which it is found in a sufficient quantity, combustible; and there is more or less of it in all bodies.

The fourth class of the mineral kingdom contains metals. These are bodies much heavier than the others: they become fluid in the fire, but resume their solidity when cold. They are bright, and are capable of being distended under the hammer. There are some metals, which though melted in the fire, do not diminish in

weight, nor undergo any other sensible alteration. This gives them the name of *perfect metals*. Of this sort there are three, gold, silver, and platina. The other metals which are called *imperfect*, are reduced more or less quickly by fire, and generally change into a calx. One of these, lead, has the property of being changed into glass, and of vitrifying all the other metals, except gold and silver. The imperfect metals are five in number, viz. quicksilver, lead, copper, iron, and tin. But there are other bodies which are distinguished from metals, not being ductile nor malleable. These are called *semi-metals*, and are seven in number, viz. platen, bismuth, nickel, arsenic, antimony, zinc, and cobalt.

The mineral kingdom may be considered as the great warehouse of nature, where she secretly labours for the good of the world. No naturalist can surprise her in her operations, and steal from her the art with which she prepares, collects, and composes earths or fossils, salts, bitumens, and metals. If we cannot guess how nature employs the matter which she every day produces, it is no less difficult to discover how the parts mix, combine, attenuate, and, in the end, form the different bodies which minerals present to us. We have but an imperfect knowledge of the surface of the earth, and we are still less acquainted with the interior parts. The deepest mines are not lower than 630 fathoms, which is not the six thousandth part of the earth's diameter. This alone may convince us how impossible it is to obtain an exact and general knowledge of nature, and of the forma-

tion of many things amongst minerals. Happily in the use we make of nature's gifts, it is of little consequence that we should know their origin and first principles. In having the knowledge necessary to apply them to our use, we know enough to glorify our Creator; as we are convinced that there is not a spot, either above or below the earth, in which he has not shown his power, wisdom, and goodness.

SEPTEMBER XIV.

Exotic Plants.

We do not pay sufficient attention to the gifts of God, particularly to those which come to us from distant countries, and are now so necessary. If we considered how much trouble it costs, how many wheels must be put in motion, and how much human industry it requires to procure us a little sugar or cinnamon, we should not receive the gifts of nature so coldly as we generally do; but, on the contrary, we should look up with the warmest gratitude towards that beneficent Being who uses so many means to bestow his blessings upon us. Let us at present consider some of the foreign productions which are become necessaries of life, and which would be so difficult for us to dispense with. Perhaps some useful reflections may arise from this; and we may think at least with pity on those unhappy

slaves, whose indefatigable labour supplies us with so many luxuries.

Sugar, properly speaking, is the juice or marrow of a certain reed, which is cultivated chiefly in Brazil and the neighbouring islands; but which also grows in great abundance in the East Indies, and some of the African islands. The preparation of sugar does not require much art; but it is extremely laborious, and is generally the employment of slaves. When the canes are ripe, they are cut and carried to the mill to be bruised, that the juice may be extracted from them. This juice is boiled, to prevent it from fermenting and turning sour. While boiling it is scummed, to take off any dirt; and this boiling is repeated four times in different caldrons. To purify and clarify it still more, they throw into it a strong lye of wood-ashes and quick-lime, and lastly, pour it into moulds, where it coagulates and dries.

Tea is the leaf of a shrub which grows in Japan, China, and other Asiatic countries. Three or four times during the spring these leaves are gathered. Those of the first crop are the finest flavoured, and the most delicate. This is the imperial tea; but it never comes into Europe. That which the Dutch sell under this name is only of the second gathering.

Coffee is the kernel of a fruit like a cherry. The tree which produces it is a native of Arabia; but it has been transplanted into several hot countries. Next to Arabia, the best place for its cultivation is the island of Martinique. The

kernel found in the middle of the fruit is called the *berry:* this, when fresh, is either yellowish, grey, or of a pale green; and it preserves this colour pretty well when dry. The fruit is spread on mats that it may be dried in the sun, and is afterwards bruised with rollers to separate the kernels. Hence it is that each berry is divided into two. The kernels are once more dried in the sun before they are put on shipboard.

Cloves are buds, or dried blossoms of a tree, which formerly grew without culture in the Molucca islands, but which the Dutch have transplanted to Amboyna. This tree is of the size and appearance of the laurel. Its trunk is covered with bark like that of the olive; and white blossoms grow in tufts at the extremities of the branches. The buds are at first of a pale green; afterwards they become yellow; then red; and at last of a dark brown, such as we see them. They have a stronger and more aromatic smell than the mother clove, which is the dry fruit of the same tree.

Cinnamon is the second bark of a kind of bay-tree, which scarcely grows any where at present but in the island of Ceylon. The root of the cinnamon tree is divided into several branches, and covered externally with a greyish bark, but with a red one within. The leaf would bear a near resemblance to that of the laurel, were it a little shorter, and more pointed. The flowers are small and white, with an agreeable fragrance like that of the lily. When the tree has attained some years' growth, the bark is taken off. The

outer bark, being good for nothing, is thrown away; the inner bark is dried in the sun till it rolls itself up, and this is what we call cinnamon.

Nutmegs and mace are the produce of a tree which grows in the Molucca islands. The nut is covered with three rinds. The first falls off itself when it is ripe. The second then appears, which is very thin and delicate. This is taken off with great care from the nut, and exposed to the sun to dry. In the Molucca islands it is called mace, and here, the nutmeg blossom. The third bark is the inner coat of the nutmeg. The nut is taken out of its stalk, and put in lime-water for some days, by which means it is properly prepared to send abroad.

Cotton grows in most parts of Asia, Africa, and America. It is enclosed in the fruit of a certain shrub; and this fruit is a sort of pod, which, when ripe, opens and shows a flock of down extremely white, which we call cotton. When the pod is swelled by the heat, it becomes as large as an apple. With a little mill they cause the seed to fall out on one side, and the cotton on the other; and afterwards spin it for all sorts of work.

Olive oil is the expressed juice of the olive tree, which is very abundant in France, Spain, Portugal, and Italy. The inhabitants of the provinces where these trees abound, make use of the oil instead of butter, because the grass being withered by the heat, they are not able to keep many cows.

Pepper is the fruit of a shrub, the stem of which requires a prop to support it. Its wood is

knotty, like the vine, to which it bears a near resemblance. Its leaves, which have a very strong smell, are of an oval form, and terminate in a point. In the middle and at the ends of the branches there are white blossoms, from which the fruit grows in clusters, like gooseberries; each cluster bearing twenty or thirty pepper corns.

It is not a little satisfaction to a reflecting mind, to contemplate the number and variety of aliments designed, not only to supply our necessities, but also to gratify our palate. Every country contributes to furnish us with the conveniences and comforts of life. The inhabitants of the most remote climates labour for us; and the unhappy slave, torn from his nearest and dearest connexions, toils to prepare those luxuries which we consume with so much profusion. Let us seriously reflect upon these things, and incessantly adore that bounteous God who furnishes our table from all parts, and renders every quarter of the globe subservient to our enjoyments.

SEPTEMBER XV.

Reflections on Myself.

I LIVE; my blood circulates, without my knowing how, through arteries and veins, which are formed for that purpose with wonderful art. I can enjoy the sweets of sleep; and in that insensible state, when my body appears motionless and lifeless, my soul still exists. I awake; my senses resume their functions, and my soul re-

ceives clearer and more lively impressions. I eat, I drink, and, on all sides surrounded with the beauties and treasures of nature, I experience a thousand pleasing sensations. Am I the cause of these effects? Did I give to the first principles, the first lineaments of my body, this wonderful motion, when I was plunged in nothingness, and knew not what motion was? Did *I* form the many different parts of my body? *I* who do not even now comprehend their arrangement and combination? Was I wiser before I existed, or did my existence precede that of my thinking principle? How is it that I cannot determine the point which separates sleep from waking? What is the mechanism of my stomach, which digests food without my directing, or in any way contributing towards it; and how is this digestion contrived? Why are all creatures of my species formed as I am; and why did I not form myself differently? Did I create all the beauties of nature, or did they also produce themselves? What makes me susceptible of pleasure and pain? Who is it that makes the bread to grow in the ground, and the water to spring up, that my body may not wither away, nor my limbs lose their motion? Who causes the rays of light to fall upon my eyes, that I may not be enveloped in perpetual darkness? Whence proceed the blessings I experience, and whence the pain and grief of which I am so sensible? Why do I not enjoy continual health? And why was I so cruel as to form myself with so many imperfections? Does every thing proceed

from me? Have I power and activity enough for this? And are all my fellow-creatures endowed with the same faculties?

These extravagant and contradictory thoughts only serve to discover the perverseness of those who indulge them. My soul, limited and imperfect as it is, declares the greatness of that Being who formed it,—a Being necessarily self-existent, and infinitely perfect, on whom I am entirely dependent. This body which I bear, and of whose structure I am comparatively ignorant, proves that there must be a wise Workman, whose greatness my feeble intellect cannot fathom, and who has made and arranged these muscles, nerves, and veins, and all the parts of my body, in so wonderful a manner.

How could *man*, that weak and limited being, contrive and execute the original of a machine so complete and so artfully constructed; he who is not able even to copy or make an exact representation of it? There is not the smallest particle of our bodies for which there is not a sufficient reason; and which is not either absolutely necessary, or at least made such by its connexion with the other parts. Experience, as well as reason, proves this beyond a doubt; and certainly the Creator must be infinitely great, since I am not the only being who may glory in having been formed with so much wisdom and with such wonderful art. Millions of my fellow-creatures, innumerable multitudes of animate and inanimate beings seem to cry out with one voice, "Behold the invisible God, acknowledge him in his works;

behold his greatness and perfection displayed in all of us! Reflect on the most insignificant of beings: it lives as thou dost; it has received its existence and life as thou hast. Blessings on him who has so wonderfully formed us."

To thee, O Lord! thou adorable Author of my existence, do I owe eternal praise. It is through thee that I live, move, and have my being. It is through thy goodness that my soul continues to reflect and think in a sound body. It is by thy will that all nature gladdens my heart. It is thou whose power, wisdom, and goodness, I and all intelligent beings adore. It is thy providence I bless. Thou knowest all hearts; thou regardest all our actions. Thou dost not desire that we should pass our days in darkness and sorrow; or that we should consider our existence as an evil. Thou permittest us to enjoy with gratitude the innocent pleasures of life. When the feathered chorister, cleaving the yielding air, astonishes me with the rapidity of its flight, the elegance of its form, and the sweetness of its notes, is it not proper that I should consider it as thy work, and listen to its songs as so many hymns to its Creator? Thou providest for it as well as for me. It feeds on the seeds which thou causest to grow, and the corn which seems to rot in the ground, by thy command becomes the support of my life. Thou sendest sun and rain to make the earth abound in delicious fruit, whilst I with the utmost effort could not produce a single blade of grass. It is not merly the necessaries of life that thou grantest us, but

also what the world calls riches, pleasures, fortune, and happiness. Thou directest events in such a manner, that even those which appear the most unfortunate, often contribute towards our felicity. In a word, after having formed us most admirably, thou still preservest us by a continual train of wonders.

O that the short hours of my earthly pilgrimage, those hours which can never return, may be employed in such a manner as may best answer the design of my existence; that when I leave this world, I may enter into a state of greater blessedness, and be better able to comprehend the mysteries of nature and grace. May the contemplation of thy wonders, under the influences of thy Holy Spirit, excite me to praise and adore thee to eternity!

SEPTEMBER XVI.

The Strength of the Human Body compared with that of Animals.

ALTHOUGH the human body is externally more delicate than that of most animals, yet it is very strong, and perhaps more so, in proportion to its size, than any of theirs: for when we compare the strength of a lion with that of a man, we ought to consider that this animal being armed with claws, we are apt to form a false idea of his strength from the use he makes of them. But there is a better method of comparing the strength of men

and animals; and this is by the weight they can carry. If it were possible to unite in one point, or to collect into one effort, all the strength that a man exerts ina day, we should find that the weight he could lift every day a foot from the ground, without injuring himself, would be equal to one million seven hundred and twenty-eight thousand pounds. Men accustomed to hard labour can generally carry a burden of a hundred and fifty, or two hundred pounds weight, without much exertion; and common porters often carry from seven to eight hundred pounds weight. In London, those who work at the quays, in loading and unloading ships, sometimes carry burdens too weighty for an ordinary horse.

The size of a man's body is in proportion to that of a horse, as one is to six or seven. If, therefore, the strength of the horse were proportionate to that of a man, he would be able to carry a load of twelve or fourteen thousand pounds weight. But no horse can carry so much; and, allowing for the difference of size, his strength is only equal, if not inferior, to that of man. A learned Frenchman made an experiment to ascertain the strength of the human body. He contrived a sort of harness, by means of which he placed on every part of a man's body standing upright, a certain number of weights, so that each part of the body supported as much as it could bear relatively to the rest, each having its due proportion of the load. This machine enabled the man to carry a weight of two thousand pounds, without his being overloaded. We may

also form some judgement of a man's strength, by the continuance of his exercise, and the agility of his motions. Men, who are used to running, get the start of horses, or at least can bear the exercise longer: and even in walking, a man who has been accustomed to it will go farther in a day than a horse can; and if he should go no farther, he will be able to continue his journey many days without inconvenience, while the horse will be exhausted with fatigue in a much less time. At Ispahan, the couriers go near a hundred and thirty miles in ten or twelve hours. Travellers assure us, that the Hottentots outrun lions, and that the American savages pursue the elk with such rapidity, that they tire it, and eventually seize it, though this animal is as swift as the stag. Many other remarkable things are related of the fleetness of the Indians, and of the long journeys they perform on foot over the rugged mountains, and through countries where there is no beaten path. They are even said to travel a thousand or twelve hundred leagues in six weeks or two months. Is there any animal, except birds, with muscles strong enough to bear fatigue so long? The civilized part of mankind do not know their own strength. They know not what they lose by effeminacy, or how much may be gained by the use of exercise. There are sometimes men of very extraordinary strength amongst us; but this gift of nature, which would be so valuable if necessary to be employed in their defence, or in useful labour, is of very little advantage to a polished people, where the mind does more than

the body, and where manual labour is left to the lowest order of society.

Here we may observe the admirable wisdom with which God has formed our bodies, and rendered them capable of such activity. At the same time we cannot but look with pity on those indolent beings who pass their lives in idleness, sloth, and effeminacy, and who cannot resolve to exercise their strength for fear of hurting their health, and endangering their lives. But why has God given us such powers, if it be not to make use of them? When, therefore, we waste them in effeminate indolence, we refuse to conform to the will of our Creator, and are guilty of unpardonable ingratitude. Let us in future exert all our powers in the service of our fellow-creatures, according to the situation in which God has placed us in this world, and, if circumstances require it, let us cheerfully earn our bread with the sweat of our brow. Even then we shall be happier than thousands of our fellow-creatures, who groan beneath the intolerable yoke of slavery, and who, when exhausted with pain and labour, have no means of procuring ease or comfort. The more happy we find ourselves in comparison with these, the more attentively should we fill up our various duties; and the success of our labours should render us truly grateful to God for that strength which he has preserved to the present period.

SEPTEMBER XVII.

Instinct of the Butterfly in the propagation of its Species.

ABOUT this season butterflies begin to disappear; but the race is not extinct. They live in their posterity; and, by a wonderful instinct, have taken care to provide for the preservation of their species. From their eggs new generations will proceed; but where do they place them at the approach of winter, or how can they defend them from the rain and the inclemency of the air? Are they not in danger of being frozen, or washed away? The beneficent Being who gives wisdom to man, has also vouchsafed to instruct the butterfly how to secure the only surviving legacy it can bequeath to the world, by pasting over its eggs with a gluey substance drawn from its own body. This sort of glue is so close and compact, that the rain cannot penetrate it, and the ordinary cold of winter cannot kill the young ones which are included in the eggs. But it is observable, that though each species follows the same method from generation to generation, yet there is a great variety in the measures which different species of butterflies take for the preservation of their race. Naturalists inform us, that some of these insects lay their eggs in the beginning of autumn, and die soon after. The sun, which has still some power, warms the eggs, and before winter a number of

little caterpillars are produced. These immediately begin to spin, and with their thread make themselves very spacious nests, where they pass the cold season of the year without eating, and almost without motion. When this retreat is opened, it appears, that what they spin serves both for bed and covering. It is also remarkable that butterflies, as well as other insects, constantly lay their eggs on select plants fit for their young, and such as will afford them the necessary food. Thus, when they are hatched, they find themselves surrounded with proper aliments, without being obliged to change their place at a time when they are too feeble to undertake long journeys.

All these things, and many others of the same nature, are calculated to make us admire the wise plans of a protecting Providence. If any thing but miracles, absolutely out of the course of nature, could affect and excite our attention, the consideration of the cares which these insects have for their progeny, so diverse in different species, but always uniform and constant in each individual, would fill us with the greatest admiration. Let us, who are rational beings, learn from these little creatures to maintain in our hearts the love of posterity, and to interest ourselves effectually for those that are to come after us. Let us not be discouraged in the projects and schemes we form, by the thought that death may overtake us before we have accomplished them. Let us remember what we owe to society, and that we ought to take at least as much

interest in what relates to posterity as those who came before us did in what relates to this age. It is particularly the duty of parents to learn from the butterfly to provide for the welfare of the children who survive them; and to place them beforehand in as agreeable a situation as they can. We certainly cannot foresee, nor consequently prevent, the wants and misfortunes to which they may be exposed by unforeseen accidents; but at least, they should not be made unhappy through our fault.

SEPTEMBER XVIII.

The Vine.

We need only reflect on the vine, to be convinced how unreasonable those are who complain of the inequalities and unevenness of the ground. The vine never flourishes in a flat country; neither does every hill agree with it, but only those which are turned towards the east or south. Hills are in a manner the bulwarks of nature, which she invites us to garnish as so many vast walls for fruit, where the reflected heat of the sun is found united to the salubrity of the open air. Even the most barren hills, and those hanging grounds where the plough cannot be used, are annually clothed with the most beautiful verdure, and produce the most delicious of all fruit. If the soil where the vine grows appear poor and bad, the plant itself is little better.

Who could have imagined that the meanest, most deformed, most brittle, and useless wood in the world could have produced such a delicious liquor! And yet such is the vegetative energy of the vine, that the sap flows through with six or eight times the force that the blood does in the veins of animals. The evaporation from the vine is also so considerable, that, to supply what is exhaled through the leaves, a hundred and fifty-two inches of sap are required to rise in the space of twelve hours. Who has endued the vine with qualities so superior to the meanness of its origin and the poverty of its native ground? Who gave it such spirit and energy, which not only preserve it for many years, but even enable it to acquire new degrees of strength?

Much wisdom is displayed in the distribution of vineyards over the earth. These do not succeed equally in all places; but to thrive well they should be situated between the fortieth and fiftieth degrees of latitude, consequently about the middle of the globe. Asia is properly the country of the vine; whence its cultivation has gradually extended into Europe. The Phœnicians, who at a very early period travelled over all the Mediterranean coasts, conveyed it to several islands, and to the continent. It succeeded wonderfully in the islands of the Archipelago, and was afterwards carried into Italy. The vine was there greatly multiplied: and the Gauls having tasted the juice, and wishing to settle in the place where it was produced, passed the Alps,

and conquered both sides of the Po. By degrees vines were cultivated all over France, and at last on the borders of the Rhine, the Moselle, the Neckar, and in other parts of Germany.

These observations may give rise to many important reflections. As the most barren soil is fit for the culture of vines, so it often happens that the poorest countries are favourable to science and wisdom. In provinces universally despised for their poverty, men of genius have arisen, whose knowledge has illuminated other countries. There is, in fact, no place so desert, no town so small, nor village so miserable, in which certain branches of learning have not been cultivated with success. They want nothing but encouragement. And how abundantly useful might we be, did we take the trouble to promote as much as possible the culture of the human heart! Sovereigns, ministers, instructors of youth, how much might you contribute to the happiness of your contemporaries and posterity, were you, by exhortations, rewards, useful establishments, and other encouragements, to endeavour to bring back wisdom, religion, and social virtues, into ruined towns and wretched villages! Such endeavours are scarcely ever useless. We are rewarded, or at least our descendants reap the fruits of them; and we should be numbered amongst those respectable men, who by becoming the benefactors of mankind, secure to themselves the approbation of God, and the blessing of their fellow-creatures.

The vine, with its dry and shapeless wood, is

an emblem of those who, devoid of the outward splendor of birth and honours, fail not to be very useful. How often does it happen that men who live in obscurity, and whose appearance promises nothing, perform actions, and execute enterprises, which raise them above all the princes of the earth!

Let us here reflect on JESUS CHRIST himself. To judge of him from the humble state in which he appeared, we should never have expected such astonishing miracles, and works so beneficial to the human race. This JESUS, who, like the vine, was planted in a barren soil, has borne fruit which is a blessing and salvation to the whole earth. He has also proved to us, that one who is poor, despised, and miserable in this world, may, notwithstanding, labour successfully for the glory of God and the good of mankind.

SEPTEMBER XIX.

Daily Wonders performed by God.

THE universe, which still subsists in its original beauty and order, is a miracle constantly before us. What an astonishing world is this we inhabit! How great the number, the variety, and the beauty of the creatures it contains! What hand but that of the Most High could have placed in the immense expanse, the sun, and all those stars, whose size and prodigious distance confound our imagination? Who but God has prescribed to them the course which they have run with such

exactness for thousands of years? Who has calculated so exactly the respective force of all these globes, and established so perfect a balance between them and the air in which they are suspended. Who has placed the earth at such a due distance from the sun, that it is neither too near nor too remote? The vicissitudes of day and night, the revolutions of the seasons, the innumerable multitude of animals, reptiles, trees, and plants which the earth produces, are all the work of God. If such a wonderful world were now created before our eyes, who would not consider it as one of the greatest miracles of almighty power? The particular providence of God clearly demonstrates his greatness, power, wisdom, and omnipresence. His marked attention to his creatures, of which every one receives particular proofs; the various methods he uses to lead mankind to their duty; the paths by which he conducts them to happiness; the adversity he makes use of to awaken and force them to self-recollection; the extraordinary events which he turns to the advantage of his purposes, events which generally are produced by small causes, and under circumstances which appear to render them impossible; the great revolutions which he effects to spread the knowledge of his Gospel from one country to another;—these are so many effects in which we ought to acknowledge the ever active hand of God, and exclaim with the Psalmist, "This is the Lord's doing, and it is marvellous in our eyes."

Let us only be attentive to what presents itself

to our notice, and we shall every where discover traces of our Creator: we shall see that, by the ordinary means of grace, he is continually working for our salvation, that his blessed word dwells among us, and that his divine voice may continually be heard. Surely those who refuse to listen to him, who resist the impulse of his Holy Spirit, and who contemn his merciful visitations, would not be reformed though new miracles should be wrought before their eyes. Man, who considers that God has created the earth with all its wonders, who is every moment loaded with heavenly benedictions, and who has received from the hand of Omnipotence all the comforts he enjoys, ought to believe, to love, and to obey his Divine Patron. Yet he resists his will! What then can affect him, or whom will he not presume to oppose?

Let us who daily witness the wonders of our God, pay due attention to them, and not shut our hearts against the truth. Let neither prejudice nor passion prevent us from meditating on the wonderful works of God. If we do but contemplate the visible world, and reflect on ourselves, we shall find sufficient cause to acknowledge Him who performs so many daily wonders in our sight. Occupied with these grand ideas, and impressed with rapturous admiration, we shall then exclaim, Praise, honour, and glory be ascribed unto God, the author of supreme good, and the redeemer of our souls! To that God who alone performs wonders, and refreshes the heart of man with sweet consolation; to him

who assuages our anguish, supports us in our afflictions, and wipes away all tears from our eyes; to him be rendered the humble tribute of grateful adoration to all eternity.

SEPTEMBER XX.

Digestion of Food.

DIGESTION is a wonderful and complicated piece of mechanism, which we perform every day, without knowing how, and without even taking the trouble to learn what is most remarkable and essential in so important a function of the human body. It is happy for us, that, in order to digest well, it is not necessary to know how it is performed; but it is still desirable to be acquainted with the process, to have some idea at least of the operations of nature in this respect.

When the food has been masticated and properly moistened, it is in a proper state to be sent from the mouth into the œsophagus or gullet. This is the last office, in regard to digestion, in which our will has any part; for all the rest is done without our being conscious of it, and even without our being able to prevent it, if we wished to do so. As soon as a bit enters the œsophagus, it thrusts it forward, by a mechanism peculiar to itself, and forces it into the stomach, whither its own gravity would not carry it. Having entered the stomach, the food is there reduced by some particular

means into a soft paste of a greyish colour, which, after being sufficiently attenuated, passes into the first intestine, called the duodenum. Here the alimentary mass undergoes new changes. Several little vessels, which come from the gall bladder, and from a gland placed behind the bottom of the stomach, which is called the pancreas, terminate at the duodenum, and pour into it the bile and pancreatic juice, which are there mixed with the food. Besides these, there are a multitude of glands in the intestines, which diffuse their humours through every part of the alimentary mass. It is after this mixture, that the true chyle is discovered amongst this mass; and there is much reason to believe, that the digestion is completed in the duodenum.

The mass of food continues its course through the other intestines, where it is continually moistened by the juices which separate in their cavities. The chyle begins then to pass into the lacteal veins, which open on every side through the intestines, and afterwards terminate in the reservoir of chyle. This is placed in that part of the back where the first lumbar vertebra begins, and from it the thoracic duct rises and ascends through the chest. The chyle passes through this canal, and, mixing afterwards with the blood, goes into the heart, and thence through all the veins of the body, after having lost its white or greyish colour.

But there are always some parts of the food which are too gross to be converted into chyle. These are propelled downwards by a motion pecu-

liar to the intestines, by means of which they are alternately contracted and relaxed. When this motion has caused the alimentary mass to advance as far as the third intestine, it propels the remainder through the fourth, fifth, and sixth, which last is called the *rectum*, and is provided with a strong circular muscle, the sphincter, for the purpose of preventing the residuum continually passing through. Thus retarded, it remains till the quantity occasions irritation, and is then finally evacuated.

This is a slight sketch of the manner in which digestion is performed within us; a point so essential to our health, and even to our existence. Let us reflect how evidently the wisdom of God appears in all this. How many wonderful circumstances must unite for this operation! The stomach must not only have an inward heat and a dissolving fluid, but also a peristaltic motion, in order to reduce the food into a soft paste, and change it afterwards into chyle, which disperses through all the limbs of the body, and supplies them with blood and nourishment. The saliva is also necessary, which has the properties of soap, and the virtue of mixing together oily and watery substances. It is necessary, that through the whole course which the food takes, there should be certain machines, to separate from the blood many humours which are required for its perfect elaboration, and the completion of the chyle; it is necessary that the tongue and muscles of the cheeks, the teeth, and some other organs, should divide, grind, and

attenuate the food before it descends into the stomach. What infinite wisdom is discovered in all this! How inexcusable should we be, were we not prompted by these wonders to praise and glorify our adorable Creator!

SEPTEMBER XXI.

The Prevalence of Good over Evil in this World.

NOTHING is better calculated to comfort us in disappointment and distress, than admitting as a principle, that there is more good than evil in the world. Let us consult the most wretched of men, and ask if he can mention as many causes of complaint as he has motives for gratitude. It will appear, that, however great his misfortunes may be, they are not equal to the multitude of blessings he has received in the course of his life.

To prove this truth more clearly, let us reckon the days we have passed in health, and the small number in which we have been sick. To the few vexations and sorrows we have experienced in domestic and civil society, let us oppose the many pleasures they have afforded us. Compare all the good and innocent actions by which the greater part of mankind render themselves useful, with the few hurtful actions they are guilty of. Let us reckon, if we can, all the pleasing sensations which each sense affords us, and all the pleasures belonging to every age, condition, and profession; let us count the gifts which

nature bestows in such abundance, and which human industry makes use of to furnish us with an infinity of pleasures and conveniences. Let us recollect the satisfaction we felt, when we escaped any danger, or gained any victory over ourselves, or performed any virtuous or wise action. Let us reckon all the blessings we remember to have enjoyed, and consider, at the same time, that we can enumerate but the smallest part of them. Let us also consider that it is only the *habit* of receiving good which renders us at all sensible of evil; that new blessings cause us to forget those that are past; and that if the impressions of our misfortunes be deeply engraven in our memories, it is precisely because they seldom afflict us.

Let us oppose to the blessings the fruition of which we recollect, those evils whose utility we do not yet know. I do not speak of *all* the evils we remember, for I do not mean those which lead to good, and have been the source of many great advantages. I do not speak of those evils, which being preservatives from greater, are dispensed to mankind to make them better and happier, or to instruct others by their example. These sorts of evils are compensated by very beneficent effects. In the calculation I wish to make, we must only oppose to the blessings we recollect, those evils which we do not yet know the use of; and if we make this computation in moments of coolness and tranquillity, and not in the time of disappointment, sorrow, or affliction, we shall be fully convinced that the prevalence of good, even in our

present state of existence, is much greater than that of evil.

Why then do men so seldom reflect on the continual proofs which they receive of their Maker's goodness? Why do they love to contemplate the gloomy side of things, and torment themselves with unseasonable cares and anxieties? Does not Divine Providence surround us with pleasing objects? Why then dwell perpetually on our infirmities, on what we cannot have, and on the misfortunes which may happen to us? Why magnify them in our imagination, and perversely turn our eyes from all that might make us easy and cheerful? But thus it is. The least distress fixes our whole attention, whilst a long train of happy hours pass away unobserved. We draw misfortune and sorrow upon ourselves, which would not happen, if we were more attentive to God's blessings. Let us banish opinions that must render us miserable. Let us be fully assured that God has bestowed his blessings impartially throughout the world, and that no man has a right to complain, but, on the contrary, a thousand just reasons for praise and gratitude.

Blessed be that God who is our sovereign good! He pours joy and gladness into our hearts; and, though he sometimes tries us with affliction, he soon pours the balm of consolation into our souls, and cheers us with the sweet anticipation of eternal and unclouded happiness. By secret and unknown paths he leads to the enjoyment of many blessings: and even the trials he occasionally sends are intended to accomplish the most

beneficent designs, which we shall one day gratefully acknowledge. In the mean time we may repose securely on his tender care and paternal protection; knowing that his eye is continually upon us, and that he will never permit us to be tried above our strength.

SEPTEMBER XXII.

Enmity between Animals.

A CONSTANT enmity is observable among animals; for they are continually attacking and pursuing each other, and every element is to them a field of battle. The eagle is a terror to the inhabitants of the air; the tiger lives by carnage on the earth; the pike in the waters; and the mole under ground. In these and many other animals, it is the want of food which induces them to destroy one another; but there is an antipathy between some creatures which does not proceed from the same cause. It is evident, for example, that the animals which twist themselves round the trunk of the elephant, and press it till they have suffocated him, do it not with a design of procuring food. When the ermine leaps up and fixes itself in the ear of the bear or the elk, and bites them with his sharp teeth, we cannot say that these hostilities are occasioned by hunger. Besides this, there is not an animal on earth, however small, that does not serve as food for others.

I know well, that to some persons this plan of nature will appear cruel and improper. But I will venture to maintain, that this very antipathy amongst animals, is a convincing proof, that all is wisely ordered. If we consider animals in the whole, we shall find the necessity of some species subsisting upon others; for on the one hand, without this arrangement many creatures could not exist; and on the other, these numerous species, instead of being prejudicial, are extremely useful.

Insects, and many reptiles, feed on carrion. Others fix in the bodies of certain animals, and live upon their flesh and blood; and these same insects serve as food to others. Carnivorous animals, and birds of prey, kill and feed upon other animals. Some species multiply so rapidly, that they would be a burden to us were there not a stop put to such increase. If there were no sparrows to destroy insects, what would become of the fruit and flowers? Were it not for the ichneumon, which seeks the eggs of the crocodile to destroy and break them, this terrible animal would multiply to an alarming degree. A great part of the earth would be desert, and many sorts of creatures could not exist, were there no carnivorous animals. It may perhaps be said, that they might live on vegetables; but, if so, our fields would scarcely suffice to feed the sparrows and swallows. And how could fish subsist were they not to feed on the inhabitants of the water? There is reason also to suppose, that, if these hostilities and depredations were to cease, animals

would lose much of their vivacity and industry, the creation would be less animated, and man himself would lose a great degree of his activity. We may add, that many striking proofs of Divine wisdom would be wanting were there an universal peace among animals; for the address, sagacity, and wonderful instinct with which they lay snares for, and surprise, their prey, evidently manifest the wisdom of the Creator.

So far, then, is the enmity among animals from casting a shade over the wisdom and goodness of God, that these perfections, on the contrary, shine with double lustre from it. It is consistent with the plan of the world, that one animal should persecute another. I confess we might complain, if the entire destruction of any species were the result: but this never happens; on the contrary, the enmity which subsists among animals is the real cause of preserving a perfect balance. Carnivorous animals are therefore indispensable links in the chain of beings; but, for this same reason, their number is small in comparison with that of useful animals.

It is particularly worthy of remark, that the strongest and most savage animals have generally the least skill and cunning. They either mutually destroy each other, or their young fall victims to some other beast of prey. For this reason nature has endowed the weakest animals with so much industry, and so many means of defence. They have instinct, swiftness, address, and cunning, to counterbalance the strength of their enemies. Can any one behold this without

acknowledging the infinite wisdom of the Creator, and confessing that this continual warfare, which at first appears so strange, is in fact a real good?

We should be still more convinced of this, if we were better acquainted with the whole system of things, and the connexion and relation each creature bears to another. But this is a knowledge reserved for a future state, where the Divine perfections will be more clearly explained to us. Even in this world, we may, in some measure, comprehend why the hostilities between *animals* are necessary. But we can by no means conceive why *men*, whose nature is so much more noble, should be continually fomenting wars and divisions so destructive to their race. Alas! it must be confessed, to the shame of humanity, that there are men who, even while they profess the Christian religion, are more ferocious and destructive than the most savage beasts; their hostilities are more multiplied, and they use more dark and secret means to destroy each other. Nothing is more contrary to our destination than such conduct. The intention of God is, that every man should make himself useful to his fellow-creatures, and, as much as possible, render their lives agreeable and happy; in a word, do them all the good offices in his power. Let us not oppose his merciful views, but endeavour to live in peace and harmony. Let animals, void of reason, persecute, hate, and destroy one another; but let us follow the example of our Saviour, in loving and endeavouring to make each other happy.

SEPTEMBER XXIII.

Moral Use of the Night.

THE days begin to shorten, and the nights to lengthen; and with this change many people are discontented. Some wish that there were no nights at all, or at least that they were all the year as short as in the months of June and July. But such wishes are unreasonable, and betray our ignorance. If we would take the trouble to reflect on the advantages resulting from the vicissitudes of day and night, we should not be so hasty in our judgements; nor make such groundless complaints: but rather acknowledge the use of night, and bless God for it.

One circumstance which should make us feel the moral advantage of the night, is, that it interrupts the course of most vices, or at least of those which are most fatal to society. Darkness obliges the wicked man to take some repose, and it gives some hours of relief to oppressed virtue. The fraudulent tradesman ceases during the night to deceive his neighbour; and darkness puts a stop to a thousand disorders. Were men to be awake twice as long as they are at present, to what a frightful degree would wickedness increase! In yielding to vice, without interruption, trangressors would acquire a horrid familiarity with sin. In a word, we may allow, that the longer the nights are, the fewer crimes are committed in the space of twenty-four hours;

and this is undoubtedly not the least advantage we derive from the night.

Of how much instruction and mental pleasure should we be deprived if there were no night. Even the wonders of creation exhibited in the starry heavens, would then be lost to us. But while succeeding nights display the magnificence of God in the stars, we may raise our souls to Him in pious adoration. If every thing which reminds us of Deity be desirable, how ought we to love the night, which so forcibly proclaims his perfections! Did we pay proper attention to this subject, the longest night, instead of appearing tedious, would prove equally instructive and beneficial. Let us therefore contemplate with seriousness, that immense theatre of created wonders which the night exhibits to our view. A single good thought excited on such an occasion, a thought which may sweeten our slumbers, and add pleasure to our waking hours, may be of the greatest utility to our understanding and to our heart.

To the lovers of calm and tranquil meditation, night is, in general, a most desirable and advantageous time. The hurry and dissipation in which we usually pass the day, leave us but little time to recollect ourselves, or to think seriously of our duties; but the tranquillity of night invites to that salutary employment. We may then, without interruption, commune with our hearts, and acquire the most important knowledge—the knowledge of ourselves. The soul may collect all its forces, and direct them towards objects which

concern its everlasting happiness. We may then banish the ill impressions received from the world, and strengthen our minds against the seducing examples of the age. This is the season for reflecting on death, and its important consequences. The tranquil solitude of the closet is favourable to religious thoughts, and inspires us more and more with a desire to indulge them.

May all the nights we spend on this terraqueous globe be sanctified by these salutary reflections! Then, instead of repining at the vicissitudes of day and night, we shall adore our Maker for them, and bless the season in which we have become acquainted with our own nature, the glory of God, and the things which pertain to our eternal peace.

SEPTEMBER XXIV.

Man's Indifference to the Works of Nature.

WHY are men, generally speaking, so indifferent to the works of God in nature? An answer to this question may give rise to many important reflections.

The first cause of this indifference is *inattention*. We are so accustomed to the beauties of nature, that we neglect to admire the impress of their *Creator's* wisdom, and are too unmindful of the numerous advantages we derive from them. Too many people resemble the stupid beast that feeds upon the grass, and drinks of the cooling

stream, without reflecting on the wisdom which ordained, or the hand which bestows these blessings. Thus men, though endowed with the most excellent faculties, by which they are enabled to enjoy a greater share of nature's blessings, seldom think of the source whence they flow: and even when God's goodness and wisdom are most evidently visible, they are little affected, because they are used to them: habit renders them insensible and indifferent, instead of exciting their admiration and gratitude.

A second cause of this reprehensible indifference in many people is *ignorance*. How many are there who are wholly unacquainted with the most common objects! They every day behold the sun rise and set; their meadows are moistened sometimes with rain or dew, and sometimes with snow. The most wonderful revolutions happen before their eyes every spring:—but they do not take the trouble to inquire into the causes and purposes of these several phenomena: and, in that respect, live in the most profound ignorance. It is true, that there are many things which will ever be incomprehensible to us, however diligently we may study them; and we are never more sensible of the limited state of our knowledge than when we undertake to search into the operations of nature. But we may at least acquire a historical knowledge of it; and the lowest peasant may comprehend how it happens that the seed which he sows in the ground shoots up into a plant, if he will take the trouble to inform himself of it.

Private interest may be considered as a third cause which renders men indifferent to the works of nature. I am convinced there would be more attentive observers of nature, if, for example, the spider spun threads of gold, if lobsters contained pearls, or if the flowers of the field could make old people young. We generally value things according to our interest or fancy; while all other objects are deemed unworthy our attention. Our self-love is so unreasonable, and we know so little of our real interest, that we often despise what is of the greatest utility. Corn, for instance, is indispensably necessary to our subsistence, and yet we behold entire fields covered with this useful production of nature, without attending to it.

A fourth cause which militates against the contemplation of nature is *indolence*. People are too fond of repose to devote even a few hours to reflections on the starry heavens. They cannot quit their beds early enough to behold the sun rise. They would dread the fatigue of stooping towards the ground, to observe what admirable art there appears in the formation of the grass. And yet these people, so fond of their ease, are full of zeal and activity when the indulgence of their passions is the object. It would be a sort of martyrdom to the intemperate man, or to the gamester, to be obliged to devote to the contemplation of a beautiful starry sky, the hours he passes in gaming and drinking. A man who loves walking, and who would go many miles on foot to see a friend, would be out of humour if

desired to go two miles to observe some singularity of nature.

A fifth and awful cause of the neglect of God's works is a principle of *irreligion*. There are too many who have no wish to know the greatness of their Maker; who have no taste for piety, nor the duties it prescribes. To praise and love God, and to acknowledge his blessings, would be painful and irksome tasks to them. We have too much reason to believe that this is one of the *principal* causes of the indifference of mankind to the beauties of nature. If they valued the knowledge of God above all other things, they would eagerly and willingly seize every opportunity of improving and increasing that knowledge.

Two thirds, probably, of mankind may be ranked amongst the classes I have mentioned. Would to God we could feel how ill it becomes men to be insensible to the works of the Creator, and how by this conduct they debase themselves below the very brutes! Have we eyes, and shall we not contemplate the wonders which surround us on every side? Have we ears, and shall we not listen to the hymns which every part of the creation chants to the praise of the Creator? Do we wish to contemplate Jehovah in the kingdom of his glory, and yet refuse to consider his works in the scenes of nature? Let us henceforth renounce so criminal an indifference, and endeavour to feel a portion of that sacred pleasure which penetrated the heart of David, when he reflected on the works, the magnificence, and the glory of his God.

SEPTEMBER XXV.

Various Nocturnal Meteors.

In serene weather, we often observe a circular light, or luminous ring, round the moon, which is called a halo, or crown. Its outline has sometimes the faint colours of the rainbow. The moon is in the middle of this ring, and the intermediate space is generally darker than the rest of the sky. When the moon is at the full, and elevated above the horizon, the ring appears most luminous, and is often of a considerable size. It must not be imagined that this circle is really round the moon. We must seek the cause of it in our own atmosphere, where the vapours occasion a refraction of the rays of light which penetrate through them, and produce this effect.

False moons, called *parasalenes*, are sometimes seen near the real moon, and appear nearly as large, but their light is paler. They are generally accompanied by circles, some of which are coloured like the rainbow, while others are white, and others have long luminous tails. All these phenomena, however, are but illusions produced by refraction. The light of the moon falling on aqueous, and often on frozen vapours, is variously refracted, and separates into coloured rays, which, reaching our eyes, double the image of the moon. Sometimes (though this occurs but seldom) we see by moon-light, after a heavy rain, a lunar rainbow with the same co-

lours as the solar rainbow, except that they are much fainter. This meteor is also occasioned by refraction.

When sulphureous and other vapours take fire in the higher atmosphere, we often observe streaks of light dart swiftly like rockets. When these vapours collect in a mass, take fire, and fall down, we think we see little balls of fire fall from the sky, and as, at that distance, they appear as large as a star, they are, for this reason, called falling stars. The common people fancy they are real stars, changing their place, to relax, or at least to purify themselves. Sometimes these imaginary stars are very brilliant, and beautifully coloured; slowly descending, and still acquiring new lustre, till at last they are extinguished among the vapours of the lower atmosphere, and fall on the ground, where it is said they leave a slimy, gluey matter behind them. Great balls of fire have also been seen, more luminous than the full moon, and some of them have trains of light. These are probably sulphureous and nitrous vapours which accumulate and take fire, for they generally traverse the air with great rapidity, and burst at last with a great noise. Sometimes, when the inflammable particles are of a very different nature, they disperse without noise, in the upper regions of the atmosphere.

The little flashes which are often seen in the summer evenings, after great heats, are produced by the vapours in the atmosphere, which are less visible because they are higher up. This meteor

is distinguished from real lightning by its never being accompanied with thunder; or rather, these flashes are reflections of lightning which is at too great a distance for us to hear the clap of thunder with which it is accompanied. The *flying dragon*, the *dancing goat*, and the *burning beam*, with many other meteors, owe their odd names to their singular appearance. They are nothing but gross and viscous exhalations, which ferment in the moist regions of the lower air, and which, being pressed in different directions by the agitated atmosphere, assume these various forms to which people give extraordinary names. Several naturalists have imitated these phenomena in miniature, by mixing certain substances together.

Of all the nocturnal appearances, none is more remarkable or splendid than the Aurora Borealis. It is generally observed from the beginning of autumn till spring, when the weather is calm and serene, and when the moon does not give much light. The Aurora Borealis is not always the same. It is usually towards midnight, that a light appears resembling the dawn of day. Sometimes we observe streaks of light, and white and luminous clouds, in a continual motion. But when this meteor is to rise in all its glory, we generally see (if the weather be calm and clear), towards the north, a black and thick cloud, edged on the upper surface with a white luminous border, whence dart rays, brilliant sparks, and resplendent pillars, which, as they rise, every moment grow yellow and red; afterwards meet, unite, and form luminous thick clouds; which terminate

at last in pillars of all colours, white, blue, orange, or the finest purple: whence rays of light are continually shooting out.

Such is the magnificence of God, that even the night proclaims his greatness and majesty. How then can we complain of the increasing length of the nights, when they exhibit such sublime spectacles, calculated to excite our admiration, and to improve our hearts? The phenomena we have been contemplating render the long nights of the northern nations not only supportable, but pleasing and brilliant; and though our nights are considerably shorter, they might afford us diversified pleasures were we properly attentive to the grandeur of their scenes. May we henceforth accustom ourselves to raise our eyes and our souls to heaven, and soar; in pious thought, beyond moons and stars, to our blessed Creator. May we reflect upon his grandeur, and adore him in reverential silence, when the solemnity of night announces his power. Jehovah is great. The night proclaims his wisdom and his love. The moon revolving in the plains of ether displays his majesty. The host of stars which glitter in the firmament celebrate his praise; and the mild light of the Aurora Borealis discovers the rich perfections of our God.

SEPTEMBER XXVI.

Nature displayed.

HAPPY the man, whose genius, rising above the mere gratification of his senses, prompts him to inquire, with the assistance of reason, into the true cause of things, and to penetrate the dark veil which conceals from mortals the mysteries of nature! How insensible are mankind! They stop to observe the course of a river. Supinely lying on the green turf, they contemplate the clear stream murmuring as it flows, the coolness of the water, the enamelled field, the verdure of its banks; every thing enchants their sight: but few know how to enjoy a still greater pleasure, to trace the source itself of these waters, the inexhaustible reservoir whence they proceed. Thus we generally look only on the outside of things. Our senses are charmed, but our curiosity is not excited. Content with admiring the beauty of objects, we scarcely skim the surface. Let us go deeper; let us dare to open a path to the recesses of nature. How noble is it to reflect on the principles of things, to contemplate their essence! It is to this that the wise man soars; all the rest is but the trifling amusement of the vulgar. It would be totally impossible to reckon all the blessings of nature bestowed upon us; but let us endeavour to comprehend, in some degree, how much we owe to our sovereign Benefactor. For this purpose, let us

look into the places of our several enjoyments, and first into our houses, and see what productions of the earth are there presented to us. The flowers, which appear but a mere amusement, are lovely ornaments to our retreats, and by the sweets they exhale, and their beautiful colours, charm and delight us. The orchards and kitchen gardens are not so pleasing to the eye, but they compensate by their utility, and produce successions of excellent provisions for our tables during the whole year, a thousand times more wholesome than those invented by art to excite, or (more properly speaking) to corrupt, our taste. Let us go a little further; let us quit the confinement of towns and villages, to enjoy the spacious fields where the industry of man produces that staff of life, that bread which supports the whole human species. The earth faithfully rewards the farmer's toil, and returns with incredible usury all that is laid out upon it. Unimpaired by age, it constantly resumes the charms of spring, and after having produced the most plentiful harvest, a winter's rest entirely repairs its losses. Near those fields we may see here and there barren hills, hanging grounds, where the plough cannot be used, and from which one might suppose nothing could be expected; but, behold! this sterile soil becomes clothed with verdure, and though the trees which grow upon it are useless as timber, the sand that nourishes them, moistened with a little dew, will soon force them to produce innumerable clusters of grapes, filled with a rich juice, which affords a liquor

extremely delicate, and at the same time so strong, that it preserves its perfection for many years, and bears long sea voyages, or the roughest conveyance to countries where nature has not furnished vines.

Let us now enter into the woods. The light of day obscured by the thick foliage of the stately trees, the pleasing coolness of the air, and the profound silence that reigns around, combine to impress on them a striking air of solemn magnificence. What human industry could suffice to plant, to water, and to protect those trees which are so indispensably necessary for our comfort and convenience? *He* who created them for our benefit is their sole guardian and protector.

Let us now glance at our meads and pastures. It is there that nature has shown most benevolence to man, and that the useful and beautiful are most happily blended. We behold them enamelled with flowers, and all sorts of herbs, which not only serve as pasture for animals, but many of them are delightful to us, and furnish us with excellent medicines. The chief use, however, of meadows and fields is to feed those animals which are most essential to us. How beautiful an object, how great an ornament to nature, is a river! Whether we stop to reflect upon its motion, or its utility, or whether we wish to trace its origin, the beauty of its course charms us, the multitude of blessings it affords fills us with gratitude, and the obscurity of its source raises our admiration. It is at first but a little stream

trickling down a hill, and which the smallest pebble may divert from its course: but soon, the overflowing of lakes, the melting of snow, and the falling of floods, enlarge it. It then makes itself a bed, and flows copiously into it; it enriches the fisherman's hut, and the labourer's dwelling, and after having been the ornament and delight of the country, it flows in silent majesty towards the cities, bearing on its dimpled bosom the rich treasures of commerce. "The river of God is full of water;" thousands of springs burst from the bosom of the earth, and the vast ocean embracing it, absorbs the whole.

The interior of our globe, like a vast magazine, contains, for our different uses, a variety of oleaginous juices, fertilizing salts, stones, metals, minerals, &c.

Lastly, the very air we respire is replete with blessings. The clouds which collect there, pour upon us these fruitful rains, which "water our furrows, and make them soft, and which cause the land to flow with milk and honey." The same air, besides giving free passage to those winds which sweep away contagion, transmits also this beneficial light, these salubrious rays, which illumine, warm, and quicken all nature. —Here let us pause, and adore that beneficent, that Almighty Hand, that only inexhaustible source, whence flow all our blessings. Let us endeavour to anticipate those which are eternal; for they as much surpass the present, as the heavens are beyond the earth, eternity beyond time, or the Creator beyond the creature.

SEPTEMBER XXVII.

Amphibious Animals.

BESIDES quadrupeds, birds, and fish, there are animals which can exist either on the land, or in the water; and, on this account, they are called amphibious. These are all cold-blooded, and have something forbidding in their look and figure. They have also, in general, a dark and disagreeable colour, a hoarse voice, and an offensive smell: and some of them are even venomous. Instead of bones these animals have cartilages or gristles. Most of them live concealed in dirty swampy places. Some are viviparous, others oviparous. The latter do not hatch their eggs, but leave them to the warmth of the air or the water, or lay them on dunghills. Almost all of them live by prey, which they obtain either by strength or cunning. They can in general support hunger a long time, and live a hard life. Some of them walk, and others creep, which forms them into wo classes.

To the first family belong those amphibia which have feet. The tortoise, which is of this class, is covered with a strong shell, like a buckler. Land tortoises are the smallest: some of those that live in the sea are five ells long, and weigh from eight to nine hundred pounds.

Lizards are of various kinds; some being smooth, others scaly; some with wings, and some without. Those with wings are called dragons. Among those without any, we reckon the

crocodile, the cameleon, which can live six months without food, and the salamander, which has the property of being some time in the fire without consuming, because the cold slimy fluid it emits extinguishes the coals. But of all the animals of this class, the most formidable is the crocodile. It first proceeds from an egg not larger than that of a goose; but it increases rapidly in size, and finally attains to the immense length of twenty or thirty feet. It is voracious, cunning, and cruel.

Serpents form the second class of amphibious animals. They have no feet, but crawl with a sort of winding vermicular motion, by means of scales and rings with which their bodies are covered. Their back bones are also constructed in a particular manner favourable to this motion. Some of these serpents are said to have the property of attracting birds or small animals to prey upon. Seized with terror at the sight of the serpent, and perhaps stifled with its venomous exhalations, the birds have not power to fly away, but fall into the open throat of their enemy. These creatures can stretch their jaws so considerably, that they sometimes swallow animals of greater bulk than their own heads. Several serpents have in their mouths a species of darts, called *fangs*, which they let out and in as they please; and by this mean they inject into the wound which they make, a poisonous humour, which comes from a small bag placed at the root of the tooth. This poison has the singular property of being hurtful only in wounds, for it may be taken inwardly

without danger. The serpents provided with the arms just mentioned, make but a tenth part of the whole species: the others are not venomous, though they attack men and animals with as much fury as if they could kill them. The rattlesnake is the most dangerous of any. It is generally from three to four feet long, and as thick as the thigh of a full-grown man. Its smell is strong and offensive, and it seems as if nature had designed this, as well as its rattles, to warn mankind of its approach. This reptile is most furious when tormented by hunger, or in rainy weather. It never bites till it has coiled itself into a circle; but the quickness with which it assumes this form is almost incredible. To roll itself up, to rest upon its tail, to dart upon its prey, to inflict the wound, and to retire again, are to the serpent the affairs of a moment.

Some persons may probably ask, "Why has God created such animals as seem only to exist for the inconvenience or destruction of mankind?" This and similar questions show that we only think of ourselves, that we are too hasty in passing our own opinions, and too much disposed to arraign the works of infinite wisdom. Considered in this point of view, such questions are altogether reprehensible; but if they be asked with a wish to obtain a more perfect knowledge of the Creator's skill and goodness, they are not only proper but even commendable. To those, therefore, who seek for information on this subject, I address myself:

Perhaps it may appear to you that such crea-

tures as lizards and serpents could not have been created for the general good of mankind. This judgement, however, is premature; for if among amphibious animals some are injurious, it is certain that most of them are harmless. Not a tenth part of the serpents are venomous: and those are so formed, that it is easy to escape and guard against their attacks. For example, dreadful as the rattlesnake is, it cannot conceal its approach. It is also remarkable that Providence has opposed to this animal an enemy which can conquer it. The sea-hog every where seeks the rattlesnake to devour it, and a child is strong enough to kill the most terrible of these reptiles. For a very slight blow with a stick upon the back kills them almost instantly. In addition to those remarks we may observe, it would be extremely unjust to dwell on the mischiefs which these creatures may occasion, without considering the advantages they procure us. Some amphibious animals afford excellent food; others supply us with medicaments, and the shell of the tortoise is useful for a variety of purposes. In a word, the wisdom and goodness of God are as conspicuous here as in all other parts of the creation. To reflect upon his perfections, to admire and adore them, is our duty on beholding those creatures which appear to us to be hurtful. But it can never become us to condemn or murmur at his plans. Our understandings are much too limited to be able to discover the use for which these creatures are designed.

SEPTEMBER XXVIII.

The Perfection of God's Works.

WHAT can equal the perfection of God's works, or who can describe the Almighty power displayed in them? Our admiration is not merely excited by their magnitude, number, and variety; but each particular work is formed with such infinite skill, each is so perfect in its kind, and the most minute production so exact and regular, as to proclaim the greatness and unlimited knowledge of their Author. We are with reason astonished at the different arts lately invented, by means of which things are accomplished that would have appeared supernatural to our ancestors. We measure the height, breadth, and depth of bodies; we know the orbits of the stars, and direct the course of rivers; we can raise or compress waters; construct habitations to float upon the seas; and accomplish many other works which do honour to the human understanding. But what are all the inventions of men, their most magnificent and beautiful undertakings, in comparison with the least of the works of God? How faint, how imperfect the imitation! How much beneath the original is the copy! Let the most eminent artist endeavour with all his powers to give to his work a pleasing and useful form; let him finish and polish it with all imaginable care, and after all his trouble, all his industry and endeavours, let him look at this masterpiece through a microscope,

and see how coarse, ill shaped, and rough it will appear; how much want of regularity and proportion he will discover in it! But whether we examine the works of the Almighty with the naked eye, or with the best glasses, we shall find them equally wonderful and beautiful. Perhaps through the microscope they will appear so different, that we should not think them what we had seen with the naked eye, but we shall ever find exquisite order, exactness, and symmetry, in each form.

Such is the prerogative of unlimited power, that all his works are regular and in perfect proportion. From the greatest to the least a wonderful order reigns throughout. All is in such perfect harmony, all so well connected, that no void appears. In this immense chain of created beings, no link is wanting; nothing is useless; all is as necessary to the perfection of the whole as each separate part is in itself complete and perfect. Can we describe the innumerable beauties, the various charms, the pleasing mixture of colours, the different hues, and all the ornaments of the fields, the valleys, the mountains, the forests, plants, or flowers? Is there any work of God which has not its peculiar and distinct beauty? Is not that which is most useful at the same time most beautiful? What an astonishing variety of forms, figures, and sizes do we behold among inanimate creatures, and in animated nature! This diversity is still more striking; though each is perfect, and nothing deficient or exuberant can be found in either. How great, therefore,

must *He* be who by a single act of his will, has called all these creatures into existence! But it is not necessary to go back to that time, when at his word every being was brought forth from nothing, and though created in an instant, yet in a state of perfection. Do we not each spring behold a new creation? What can be more wonderful than the revolutions of the seasons? The valleys, the fields, the forests, all die in some degree towards autumn; and nature is stripped of its ornaments in winter. All animals languish; the birds retire and cease to sing; every place becomes a desert; and nature appears benumbed and insensible. But in the mean time a divine Power acts in secret, and labours for the renewal of nature, unobserved by us. Animation is restored, and all things are preparing for a sort of resurrection.

How can we so frequently behold this magnificent scene, without adoring, with the most profound veneration, the power and glory of God? How can we ever breathe the cool refreshing air, without being led to such reflections? Does not God proclaim himself throughout all nature, as well as by revelation? May I never repose under the shade of a tufted tree, or behold a meadow enamelled with flowers, a beautiful forest, or a field of waving corn; may I never gather a flower, or enter a garden; without remembering that it is God who gives foliage to the tree, beauty and perfume to the flowers, and a pleasing verdure to the woods and meads. Struck with admiration, penetrated with gratitude, I shall then

exclaim, "O Lord! how manifold are thy works! in wisdom thou hast made them all: the earth is full of thy goodness."

SEPTEMBER XXIX.

Fruit.

THIS is the happy season in which Divine goodness lavishes every kind of fruit upon us in rich abundance. The charms of summer give place to more solid enjoyments. The boughs of the apple-tree bend under the weight of that golden fruit, the beauty of which is still heightened by its purple streaks. The melting pear, the plum sweet as honey, display their charms, and seem to invite the hand of their master. Should we not be altogether inexcusable, if, at the sight of all these blessings, derived from the immediate munificence of God, we did not endeavour to sanctify the pleasures of autumn by appropriate reflections on the kindness of our Maker? With how much wisdom has the Creator distributed fruits for the different seasons! In general, it is in summer and autumn that nature offers us these rich presents; but by the assistance of art, we are also favoured with them in winter and spring, and our tables may be furnished with certain kinds through the whole course of the year. From the beginning of June, nature of herself presents us with raspberries, gooseberries, and common cherries. The month of July furnishes

us with cherries, peaches, apricots, and some kinds of pears. August seems rather to *lavish* than *give* its fruits; figs, late cherries, and a variety of excellent pears. September provides us with some grapes, winter pears, and apples. The gifts which October bestows, are several sorts of pears, apples, and the delicious fruit of the vine.

It is with this wise economy that nature measures out and distributes her gifts; on the one hand, that we may not be overloaded with too great an abundance; and on the other that we may still have a successive variety of enjoyments. It is true, that in proportion as we advance toward winter, the number of delicious fruits is greatly diminished; but art has taught us to preserve some even for this season. God did not think proper to dispense with man's trouble for such purposes, as it was a mean to lead him to an active and laborious life. For this reason he distributed his blessings in such various ways; and ordained that they should spoil, or lose their value, if they were not properly attended to.

How abundantly has God distributed fruit to us! Notwithstanding the continual ravages of birds and insects, there still remains a sufficient quantity to compensate for this loss. Calculate, if possible, the fruit which only a hundred trees bear in a favourable year, and you will be astonished at the prodigious increase. What was the design of such abundance? If the preservation and propagation of trees were the only intention of it, much less certainly would answer

that end. It is therefore evident that the Creator designed to provide food for man, and in particular for the poor. In bestowing so much fruit, he has furnished them with an easy mode of subsistence; which is at the same time nourishing, salubrious, and so pleasing, that they have no reason to envy the rich their far-fetched dainties, so often prejudicial to health.

There is scarcely any food more nourishing than fruit. It was with a beneficent view that Providence gave them to us in a season when they are not only pleasing and refreshing to our palate, but also excellent in a medical way. Apples come seasonably during the heat of summer, because they temper the warmth of the blood, and cool the stomach and intestines. Plums have an acid sweetness, with an oily softening juice, which may make them useful in many cases: they gently open the body, and correct the acrid humours which so often occasion inflammatory disorders. If some fruits, such as peaches, apricots, and melons, are found to be unwholesome, it is a proof they were not designed for our climate, or at least for persons who cannot guard against the bad effects of too cold fruit, by wine or aromatics.

Nothing can be more delicious than fruits. Each sort has a flavour peculiar to itself; and this variety renders them doubly pleasing. Thus God, like a tender father, provides not only for the support, but also for the pleasure of his children.

While possessing and enjoying the various

fruits of which we have been speaking, let us never forget the bounty of that adorable Being who has dispensed them; but rather let us consider it our most sacred duty to consecrate ourselves to the service of this blessed parent. How pure and exalted will our felicity be, if our lives are but sincerely devoted to him! What refined pleasures shall we experience in his service here, and what a lively hope may we indulge of enjoying his smiles hereafter!

SEPTEMBER XXX.

Invitation to praise God.

JEHOVAH is great; innumerable heavens form his pavilion; he rides on the thunder-cloud as in a chariot, and the lightning walketh by his side.

The lustre of the morning is but the reflection of the hem of his garment; when he goeth forth in majestic splendor, the light of the sun is eclipsed.

Praise the Almighty God, ye luminaries of his palace; ye solar rays flame to his glory.

Earth, lift up thy voice and sing his praise. Celebrate him thou sea; foam to his honour ye billows: praise him all ye rivers.

Ye lions of the forest roar to his glory; sing unto him ye feathered inhabitants of the air: reiterate his praises ye echoes. Let universal

nature pour forth her sweetest notes, in concert, to the honour of his name.

And thou, O man, lord of this lower world, mingle thy thanksgivings with the general harmony. Jehovah has done more for thy happiness than for all the rest. He has given thee an immortal spirit, which enables thee to comprehend the structure of the universe, and to become acquainted with the springs of nature.

Exalt the Lord for thy own salvation, and remember with humble reverence that thy feeble praises are not requisite to his happiness. When thou soarest up to him, all low desires and base inclinations shall leave thy heart.

Praise him when the sun arises from his bed, painting the east with gold and purple; praise him when the departing beams of that luminary faintly irradiate the western horizon. To the voice of universal nature let the voice of thy gratitude be at all times united.

Praise him in the rainy and in the dry seasons; in the calm and in the tempest; when drifting snows descend, when the streams and rivers are blocked up with ice, and when the earth is clothed with verdure, and enamelled with flowers.

OCTOBER I.

Hymn to the Praise of God.

ALL the heavenly host glorify the power and majesty of the Creator, and all the globes which roll in the immense expanse celebrate the wisdom of his works. The sea, the mountains, and the woods, created by a single act of his will, are the harbingers of his love, the heralds of his power. Shall I alone be silent? Shall I not attempt to offer up thanksgiving though the pure spirits themselves can offer but imperfect praise? By what power do these millions of suns shine with so much splendor? Who directs the wonderful course of the spheres? What chain unites them? What force animates them? It is thy breath, O Lord! It is thy Almighty word. Thou art all in all. Thou calledst the worlds, and they obeyed. Then was our globe produced. The birds and the fish, the cattle and the wild beasts of the wood, and lastly man himself, came to inhabit it, and rejoice. Our eyes are gladdened with a variety of cheerful scenes. Sometimes they wander over the green field, or contemplate forests, whose lofty trees seem to touch the clouds. Sometimes they behold the dew-bespangled flowers, and trace the course of the limpid stream in which the trees are reflected. In order to break the force of the wind, and at the same time to afford us an enchanting scene, the moun-

tains rise up, whence burst forth the salutary springs.

At thy command, O God, the parched valley is watered with rain and dew, and the air is cooled by the refreshing zephyr. It is thy hand which spreads a green carpet under our feet, which gilds the ears of corn, and tinges the grapes with their purple hue; and when cold descends to benumb all nature, thou coverest the earth with a veil of dazzling whiteness. Through thee the mind of man penetrates even to the starry heavens. Through thee he knows the past, and can distinguish falsehood from truth, and appearance from reality. Through thee it is that he judges, desires, or fears; that he escapes from death and from the grave.—Lord! I will ever acknowledge thy greatness. Thou who readest my heart, accept the emotions it feels, though unable to express them.

OCTOBER II.

The Effects of Fire.

NOTHING in nature can exceed the violence of fire; nor can we, without astonishment, reflect on the effects it produces, and the extreme swiftness of its operations. But how few are there who attend to its effects, or think them worth observation, though we daily experience the great utility of fire in domestic life! Perhaps this is the reason we are generally inattentive to it. We ought,

however, to remember this blessing, and if possible, by reflection, learn to appreciate its true value.

One effect of fire familiar to every one, is, that of dilating such bodies as are exposed to its influence. A piece of iron made to fit a hole in a plate of metal, so that it easily passes through when cold, being heated, cannot be made to enter, but when suffered to cool, it passes into the hole with the same facility as at first. This dilation produced by fire is still more visible in fluid bodies, such as wine, beer, and more particularly air. If it were not for this property, the thermometer, by which we calculate the different degrees of heat, would be quite useless. Observe the effect of fire on inanimate and compact bodies: how soon it melts and changes them, part into fluid matter, and part into a solid of a different sort. It communicates fluidity to water, oil, fat, and to almost all metals. What renders these bodies susceptible of this change is, that their combination is more simple, and the parts which compose them are more homogeneal than in other bodies, therefore the fire penetrates the more easily into their pores, and sooner separates the parts. This also causes such kind of substances to evaporate when the fire penetrates in great quantity and with violence through them.

Some solid bodies undergo other sorts of changes. Sand, flint, slate, and spar, vitrify in the fire; while clay turns into stone. Marble, calcareous stones, and chalk, turn into lime.

The variety of these effects does not proceed from the fire, but from the different properties of the matter upon which it acts. It may produce three different effects on the same body, that of melting, vitrifying, and reducing to lime, provided that the body possess the three necessary properties of being metallic, vitrifiable, and calcareous. Thus fire of itself produces nothing new; it only developes in bodies those principles which before its action were not perceptible. Upon fluids fire produces two effects. It makes them boil, and reduces them to vapours. These vapours are formed of the most subtle parts of the fluid joined with particles of fire; and they ascend in the air, because they are specifically lighter than that fluid.

In living creatures fire produces the sensation of heat in every part of the body. Without this element the life of man could not be preserved; as a certain degree of heat is requisite to give vitality and circulation to the blood. For this purpose we are constantly inhaling fresh air, which always contains the matter of heat, and imparts it to the blood in the lungs, while this organ of respiration serves to expel the air that has lost its vivifying power.

These reflections should confirm in our minds the important truth, that God has in every instance promoted the welfare of mankind, and that he has placed proofs of his love every where before our eyes. How many advantages accrue to us from the effects of fire! By the union of fire and air the seasons are renewed, the moisture

of the soil and the health of man are preserved .By means of fire, water is put in motion, without which it would soon lose its fluidity. By the gentle motion it keeps up in all organized bodies, it gradually brings them to perfection. It preserves the branch in the bud, the plant in the seed, and the embryo in the egg. It prepares our food, contributes to the formation of metals, and renders them fit for use. In short, when we collect the several properties of fire, we find that the Creator has, by its means, spread a multitude of blessings over our globe: a truth which ought to make great impression on our hearts, and teach us to love the Author of our being, and inspire us with content. The more we search into the nature of things, the more we discover that all concur to the most perfect end. We every where behold magnificent plans, admirable order, and constant harmony between the parts and the whole, between the ends and the means.

OCTOBER III.

Instinct and Industry of Birds.

Birds have already afforded us many innocent pleasures. Now that the greatest part of these sprightly inhabitants of the air are going to disappear for a long time, let us once more reflect upon them with a lively sense of gratitude towards that God who is their Creator as well as ours. How pleasing to contemplate the several instincts

with which each bird is endowed! None of these are useless or superfluous. Each is indispensably necessary to the preservation and well-being of the bird, and ought to give us the most exalted ideas of HIM for whose pleasure all things were created.

When, in the first place, we reflect on the instinct which leads birds to move, we find in that alone just cause for admiration. Experience demonstrates that bodily motions require something more than strength, or well-formed supple limbs: it is not till after many trials and falls, that we are able to keep the balance, to walk with ease, to run, to jump, to sit down, and rise; and yet these motions seem much easier to bodies constructed like ours than to birds. These animals have but two feet; the body does not rest perpendicularly upon them; it goes beyond the feet both before and behind, and yet a chicken can stand upright, and begin to run as soon as it is emancipated from the egg. Young ducks which have been hatched by a hen, know their own element, and swim in the water without being directed by example or instruction. Other birds know how to rise from their nests into the air; to balance themselves, and take their course, beating their wings in equal measure: to stretch out their feet; spread their tail, and make use of it as an oar; and often take long journeys into countries very remote from the place of their nativity. How wonderful is the art which they use to obtain a subsistence! an art which they bring into the world with them! Certain birds, though not

aquatic, live upon fish; consequently they must have more difficulty in seizing their prey than water fowl. What does their instinct teach them in this case? They keep on the shore of this foreign element, and when the fish come in shoals which they can perceive at a distance, they pursue them, skim on the surface, dive suddenly into the water and carry off a fish. Who gave to the birds of prey their piercing sight, courage, and arms, without which it would be impossible for them to subsist? Who points out to the stork where it may find frogs and insects, on which it feeds? It must carefully search for them in the meadows, as well as in the furrows of the field. It must even prolong its search till morning, when the other birds begin to awake. What incredible strength the condor must have, if it can, as is said, carry off a deer, and kill and devour an ox! How can we reconcile with the savage nature of the quail, that maternal instinct which makes her adopt little birds of every species, and not only take them under her protection, but lavish the tenderest cares upon them? How artfully does the crow conceal the prey she cannot devour at once; and when hunger again presses her, how perfectly does she recollect the spot where she has reposited her treasure!

Much time might be devoted to observations of this sort, without our being able to explain the chief mysteries which the instinct of birds presents to us; but the little we do know is enough to employ, in the most pleasing manner, those whose hearts are disposed to contemplate the

works of nature, and to raise them to still nobler pursuits. Let us not *confine* ourselves to the consideration of the instincts and faculties of birds; which ought to be regarded as a first step leading to more sublime meditations. But let the admiration which they excite in us, elevate our souls to God, from whom these animals have received them; and who has compared and combined so many things for the subsistence and increase of this part of his creation. Let us not say, that it is from *Nature* the birds learn the art and industry which so much surprises us in them. *Nature* separated from its *Author*, is an unmeaning word.

OCTOBER IV.

Animal Reproductions.

HERE we discover a new scene of wonders, which appears totally to contradict the principles formerly adopted, in regard to the formation of organized bodies. It was a long time supposed, that animals could only multiply by eggs, or by producing young alive; but it is now found that there are some exceptions to this general rule. Certain animal bodies have been discovered, which may be divided into as many complete bodies as we please: because what is wanting to each piece when thus separated, is soon replaced. It is no longer doubted that the polypus belongs to the class of animals, though it much resembles

plants, both in form and manner of propagating. The bodies of these creatures may be cut in any way, and into as many pieces as they are cut there will be so many complete polypi. Even from the skin, or smallest bit cut off from the body, one or more polypi will be produced; and if the several little bits cut off are put together by the ends, they unite, and become one body.

This discovery has given rise to other experiments: and it has been found, that the polypus is not the only animal which can live and grow, after having been cut in pieces. The earth-worm also multiplies when cut in two; to the tail part there grows a head, and the two pieces become two complete worms. After having cut the worm in two, it would be to no purpose to put them together in order to unite them, as they would not join. They remain for some time in the same state, or grow rather smaller; then there appears at the extremity which was cut, a little whitish pimple, which gradually enlarges and lengthens. Soon afterwards, the rings are seen, at firs very close together, but insensibly extending on all sides. New lungs, new heart, new stomach, and many other organs, are then formed with the rest.

The following experiment may be made with snails. Cut off the head without going much below the two principal horns, and at the end of a certain time the head will grow again. It is the same with lobsters' claws. If one of them be broken off, and the lobster afterwards put into

the water, it will in a certain time get a new claw. Another wonderful experiment has been made by M. Duhamel upon the leg of a chicken. After the leg-bone, which had been broken, was perfectly recovered, and a callus completely formed, he cut off all the flesh of that leg, to the very bone; those parts grew again gradually, and the circulation of the blood was again restored.

We are convinced, then, that some animals are perpetuated by being divided, and that certain insects may be produced in the same way as a branch shoots out of the trunk of a tree; that they may be cut in pieces, and that the smallest of these pieces will produce others; that they may be turned inside out like a glove, and still continue to live, eat, grow, and propagate. Here a question arises, which no naturalist possibly can resolve in a satisfactory manner. How does it happen that the parts cut off grow again? It must be presumed, in this case, that the germ is spread over the whole body; whereas, in other animals it is confined to certain parts. The germ developes itself as soon as it receives proper nourishment: thus, the cutting the animal only supplies the germ with the nutritive juices, which would have flowed elsewhere, had not their course been diverted another way. Every part of a polypus or worm, contains in itself, like the bud of a tree, all the intestines necessary for the animal. These parts essential to life are dispersed over the whole body, and a circulation is carried on even in the smallest particles.

As we cannot comprehend all the means which the Author of nature makes use of to dispense life and feeling to such a prodigious multitude of beings, so we must not assert that the animals above-mentioned are the only exceptions to the general rule, in regard to their mode of propagating. The fecundity of nature, or rather the infinite wisdom of the Creator, surpasses all our weak conceptions. The hand which formed the polypus and the earth-worm has proved to us, that when necessary, it can make the animal form and constitution like simples or plants. It has done still more in other cases; and descending gradually, has arrived at the utmost limits of animal nature. But these limits are unknown to us. Let us, therefore, have a humble sense of our ignorance: let us admire and adore the supreme wisdom. Never is it more sublime than when we can no longer trace it.

Animal reproductions should remind us of the great change which shall take place in the day of resurrection. What we now behold in miniature, will then appear in magnitude. What we now observe in other bodies, we shall then experience in our own; and the smallest particles, then reunited, will form a body destined for the enjoyment of endless felicity.

OCTOBER V.

The Organs of Taste.

Our enjoyments would be considerably abridged if we had not the faculty of distinguishing different kinds of food by our taste. The variety of fruits which nature lavishes upon us at the present season, naturally leads us to reflect upon this subject. Our pleasure would be greatly diminished if the pear, the apple, the plum, and the grape, had all the same flavour. The sense of taste is therefore a gift which we owe to the goodness of God, and on which we ought gratefully to reflect.

But by what means do we taste and distinguish our food? The tongue is the principal organ; and that it may answer this end, the surface is covered with nervous papillæ, which enables us to distinguish the flavour of the salts as they dissolve upon the tongue. That the taste depends upon the nerves, or sinews, may be observed by dissecting the tongue; for, after taking off the membrane which covers it, there appears a number of roots where the nerves terminate; and it is exactly where the papillary nerves are found, that we have the sense of taste; and where they are wanting our taste fails. When we put highly flavoured things under our tongue, we are scarcely sensible of it till they are attenuated; and till we put them on its surface; consequently, the

sense of taste is not in full force but where the papillary nerves are in greatest number, and this is the part nearest to the throat. To be further convinced that taste proceeds from the nerves, we need only examine the tongue of a dog or a cat. In these animals the papillary nerves are situated towards the root of the tongue, the fore part being destitute, whilst the palate is covered with them: hence the tip of the tongue, in these quadrupeds, is not susceptible of taste.

Let us continue our reflections on this interesting subject. How ingeniously is this organ of taste formed, all the parts of which no anatomist has yet been able to find out. Is it not a proof of the greatest wisdom, that the tongue should have more sinews and fibres than any other member, and that it should be full of little pores, to let the salts and other savoury particles penetrate deeper, and in greater quantity, into the nervous papillæ? Is it not an effect of the same wisdom, that the nerves which extend as far as the palate and throat to assist mastication, should also reach to the eyes and nose, as if to direct the organs of those senses to contribute their part towards distinguishing the taste of food? The duration of these organs is another subject of admiration. Notwithstanding the delicacy of their construction, they last longer than instruments of iron or steel. Our clothes wear out, our flesh fades, and even our bones become dry; but the sense of taste survives them all. What admirable designs may we discover even in the preparation of these organs!

O man! thou art the only creature that knows he is endowed with senses: the only one capable of raising himself to God, by the contemplation and use of these faculties. Endeavour therefore, by divine assistance, to employ them properly. If *thou* wilt not acknowledge the wisdom and goodness of thy Creator, who is it that shall pay homage to him? No creature enjoys what thou dost, even in the sense of taste; for the animals have but few things on which they like to feed, whereas thy God has prepared thee food equally various and abundant. Reflect on all that the animal, vegetable, and even the mineral world affords. The heavens and the earth, the air and the ocean, offer us their tribute. Wherever we cast our eyes, we behold the gifts of Jehovah. The summits of the mountains, the depths of the valleys, and the beds of lakes and rivers, furnish us with aliments and pleasures.

It is reasonable that we should highly prize this gift of our Creator; but let us not esteem it beyond the design of the heavenly Donor. The sense of taste was given to us as a mean to conduct to the noblest end. How absurd would it be to make our principal happiness consist in these pleasures, of which this sense is the organ; and to live only to gratify the palate with savoury viands and delicious drinks. Let us not reduce ourselves to a level with the brute, whose chief delight consists in eating and drinking: but let us remember that we have an immortal soul, which cannot be satisfied with any thing less than the Supreme Good. To have a true relish for this,

and earnestly to desire to be nourished by it, constitutes the wisdom and felicity of the true Christian.

OCTOBER VI.

The Providence of God with respect to Natural Events.

ALL the events which happen in the heavens, upon the earth, in the air, and in the sea, are regulated according to the laws prescribed by nature. But it would be absurd not to acknowledge the particular providence of God, which directs natural things, and makes them concur with his own views. He makes use of natural causes to chastise or reward mankind; and it is thus, for example, that by his command the air corrupts or purifies, and the seasons become fruitful or barren. He prevents or assists the designs of man, sometimes by winds or storms, and sometimes by the flux and reflux of the sea. It is true, that God does not in general interrupt the course of nature; but it is equally true, that nature cannot act forcibly without his assistance and concurrence. The parts of which the visible world is composed, have not the faculty to make use of their strength as they please. In the mean time, God can influence his creatures without interrupting the course of nature. Fire, water, wind, and rain, have their natural causes and particular virtues; but God uses them in a

manner adapted to their nature, in order to execute his designs. He makes use of the sun to warm the earth, and to render it fruitful. He employs the rain and wind to purify and cool the air; but it is always in such a manner, and such a degree, as best comports with his own views.

A great part of the blessings and evils of this present life proceeds from the surrounding objects: but as God interests himself in all which happens to mankind, he must necessarily direct those objects, and influence all nature. On this are founded the rewards and punishments of virtue and vice. Peace and prosperity crown the one, while famine and pestilence scourge the other. In a word, all natural causes are in the hand of God, and are immediately under the guidance of his providence. Men themselves furnish an example of this, whilst their industry is seen to triumph over nature! They cannot indeed change the nature of things; but they can make use of natural causes so as to produce effects which would not have taken place without the art and directions of man. Now, if God have in some measure subjected natural causes to human industry, with how much more reason may he reserve to himself the government and direction of them! We may hence conclude how necessary it is, that a particular providence should watch over the guidance of the world. Natural causes are certainly excellent instruments; but, in order to make them useful, they ought to be in the hands of a wise Being. It would be unreasonable to wish that God should every moment

change the laws of nature; that, for example, if we fall into the fire, or into the water, we should not be consumed or drowned. Neither is Divine Providence obliged to preserve us if we shorten our lives through intemperance. For God is not obliged to work miracles to save men from misfortunes drawn upon themselves by their own irregularities. It is our duty to attribute to Providence all those particular and beneficent dispensations which relieve our wants and restore our hearts to peace: but all the disorders of nature are at the same time effects of God's anger, which serve to punish mankind. On this truth we found our prayers for the heavenly benediction, and our thanksgivings for all the blessings which God bestows upon us.

OCTOBER VII.

The inexhaustible Riches of Nature.

NATURE is so bountiful to us, so abundant in means to supply the wants of every creature, and so rich in gifts, that they can no more be numbered than the drops of water in the ocean.

How many things does one man require during a life of sixty years! How much is necessary for eating, drinking, and clothing; for the conveniences, pleasures, amusements, and duties of society: without mentioning extraordinary cases and unforeseen accidents! From the prince to the mendicant, in all situations, conditions, and

ages of man; from infancy to old age, in every country, and according to the different manners of the people, each man has his particular wants. What suits one will not suit another, and they all require different means of subsistence. Yet we find that nature can answer all these demands, and that each individual is supplied with all the necessaries of life. Since the creation, the earth has never failed to open her bosom; the mines have never been exhausted; the sea affords subsistence to numberless creatures; and the plants and trees constantly bear seed, which shoot in due season, and become fruitful. Beneficent nature varies her riches, that one place may not be too much exhausted; and when some sorts of plants or fruits begin to diminish, others are produced; and it is so ordered, that the instinct and taste of mankind should lead them to the most abundant productions.

Nature is a wise economist, and takes care that nothing shall be lost. Some advantage is derived from every thing: insects serve as food for larger animals, which in their turn are useful to man. If they do not afford us food, they furnish us with clothing, arms, and means of defence; and if none of these, they at least supply us with salutary medicines. Even when diseases sweep off some species of animals, nature repairs the loss by the increase of others. Even dust, carrion, and corrupted matter, have their uses, either as food for insects, or for manure to enrich the earth.

How beautiful is nature! Her finest clothing

requires only light and colours. With these she is abundantly provided; and the scenes she presents are continually varied, according to the points of view in which they are seen. Here the eye is struck with the beauty of form; there the ear is charmed with melodious sounds; and the smell is indulged with agreeable perfumes. In other places, art adds new embellishments to nature by a thousand ingenious works. The gifts of nature are so abundant, that even those which are continually made use of never fail. Her riches are spread over the whole earth. She varies her gifts according to the different countries. By means of commerce, she connects different nations: and the hands through which her donations pass, render them more valuable by the continual circulation. She combines and mixes her gifts as the physician does the ingredients in his prescriptions. The great and the small, the handsome and the ugly, the old and the new, combined and properly mixed, form one whole equally useful and agreeable. Such are the inexhaustible riches of nature in the hands of God.

OCTOBER VIII.

Petrifactions.

THE transformation of several substances from the animal or vegetable into the mineral kingdom, is a peculiarity of natural history deserving of our attention. The first thing worthy of remark in petrifactions is their external form, which shows that these fossils have undoubtedly belonged either to the animal or vegetable kingdom. We seldom meet with petrifactions of any part of the human body; and those of quadrupeds are nearly as scarce. The most extraordinary skeletons discovered in the earth are those of elephants; some of which are found even in different parts of Germany. Aquatic animals are frequently found petrified, and it is not uncommon to meet with entire fishes in this state, the smallest scales of which may be easily distinguished. But this is nothing in comparison of the multitude of shells, and little worms, found changed into stone in the bowels of the earth. Their number is not only prodigious, but there are more different species of them than are to be found alive. Petrifactions of marine substances are found in great abundance all over the world. There are some on the tops of mountains, many thousands of feet above the surface of the sea; and great quantities are found in the earth at different depths. All sorts of plants and vegetable substances are found petrified in different

strata of the earth; but sometimes there are only the impressions of these, the substances themselves being destroyed. In many places whole trees are found buried at different depths in the earth, and apparently converted into stone; but these petrifactions do not appear to be of a very ancient date.

Here it may naturally be asked how these petrified substances got into the earth; and particularly how they could be carried to the tops of the highest mountains. Also, how animals that generally live in the sea, could have been transported so far from their natural abode? Different causes may be assigned for this. Perhaps, these petrifactions prove, that the greatest part of the earth was formerly covered with water. And, indeed, as in every place where we search, from the top of the mountain to the greatest depths into the earth, all sorts of marine productions are found, it seems as if it could not otherwise be accounted for. The great quantity of petrified shell-fish found at considerable heights, forming regular beds, give reason to believe the mountains were formerly the bottom of the sea, and so much the more so, as we know that the present bottom of the sea is exactly like firm land. We have hitherto but a very imperfect knowledge of the manner in which nature prepares these petrifactions. It is certain that nothing will petrify in the open air; for the bodies of animals or vegetables consume or corrupt in this element; so that air must be excluded, or at least not act, where petrifactions are formed. Neither has a

barren dry earth any petrifying quality. Running water may form a crust on particular bodies, but cannot turn them into stone. The very course of the water prevents it. It is probable, therefore, that petrifactions require moist soft earth, mixed with dissolved stony particles. These stony fluids penetrate the cavities of animal and vegetable substances, and become consolidated, in proportion as the parts of these bodies are dissipated by evaporation, or absorbed by alkaline substances.

From what has been remarked we may draw some inferences which tend to explain these phenomena of nature. All animals and vegetables are not equally capable of being turned to stone; for, in order to be so, they require a degree of hardness to prevent them from corrupting before they have time to petrify. Petrifactions are generally formed in the interior of the earth, and require that the places where the bodies are deposited should be neither too dry nor too wet. All sorts of stones which contain petrifactions are the work of time, and consequently they are every day still forming; such are chalks, clays, sands, and several others; and the petrified bodies assume the nature of these stones, and become sometimes chalky, sometimes like slate, &c.

If petrifactions were of no other use than to throw some light upon the natural history of our globe, they would, from that circumstance alone, be interesting; but we may also consider them as proofs of the operations and transmuta-

tions which nature produces in secret: and here again the power and wisdom of God are most strikingly manifested.

OCTOBER IX.

Every Thing in Nature is gradual.

We may observe in nature an admirable gradation, or insensible progress, from the most simple to the most complete perfection. There is no middle species which has not something of the nature of that which precedes, or that which follows it. In a word, there is no void nor chasm in nature.

Dust and earth form the principal and component matter of all solid bodies. These are accordingly found in all bodies which human art has analyzed. From the mixture of earth with salts, oil, sulphur, &c. result different kinds of soil, more or less compound, light, or compact; and these naturally lead us to minerals.

The different species of stones are very numerous; and their figure, colour, size, and hardness, are extremely different. We find among them various metallic and saline particles, from which proceed minerals and precious stones. In the class of stones there are some with fibres and a sort of leaves; such as slate, talc, the lithophytes, or marine stony plants; and the amianthus, or the stony flower of the mine, which leads us from the mineral to the vegetable kingdom.

The plant which appears to be the lowest among vegetables is the truffle, and next to it are the numerous species of mushrooms and mosses. All these plants are imperfect; and, properly speaking, only form the limits of the vegetable world. The more perfect plants divide themselves into three great families, which are dispersed over the whole earth—herbs, shrubs, and trees. The polypus, from its external appearance, might be taken for nothing more than a mere plant, but from the functions it is known to perform, it seems to partake both of the vegetable and animal kingdom; and forms a connecting link between plants and animals.

Worms commence the animal kingdom, and lead us to insects. Those which have their bodies enclosed in shells, seem to unite insects to shell-fish. Between these, or rather next to them, come reptiles, which, by means of the water-snake, are linked with the fish. The flying-fish leads us to birds. The ostrich, which has legs something like those of a goat, and which rather runs than flies, seems to link birds with quadrupeds; and the ape joins hand with man and beast.

There are gradations in human nature, as well as in every thing else. Between the most perfect state of man and the ape, there are a wonderful multitude of links; but how many more are there between men and angels! How many between an archangel and the Creator of all things! Here we behold a new train of gradations, new plans, and new perfections. But an

impenetrable veil conceals from us those of the world to come.

Let us reflect on these gradations of nature: what has been said may suffice to show us, that all things in the universe have a relation to each other. There is nothing without its design; nothing which is not the immediate effect of something which preceded it, or which does not determine the existence of something which is to follow. Nature proceeds by degrees, from the least to the most perfect, from the nearest to the more distant, from the inanimate to the animate, from bodily to spiritual perfection. But how imperfect still is our knowledge of this immense chain of beings! We can but partly distinguish them, and know but a small number of the links; and yet, defective as our knowledge is in this respect, it is ample enough to give us the highest idea of that admirable series and infinite variety of beings of which the universe is composed. May the whole lead us to thee, thou supreme Being, although there is between thee and us a distance which no understanding can measure. Thou art the only Being beyond the chain of nature. From the grain of sand to the cherubim every being owes its existence and perfection to thee.

OCTOBER X.

The Fall of the Leaf.

We begin to perceive the effect of approaching winter in the woods and gardens. Almost all the plants are losing their leaves, their chief ornaments. The most natural way this can be accounted for is from the cold; for the leaves are no sooner covered with frost than they begin to fall in abundance, and all the vegetables are stripped of their clothing. It cannot be otherwise, as the cold causes the sap to stagnate in the plants. But cold is not the only cause of the leaves falling; for this happens even in mild winters when there is scarcely any frost; and to those trees which are put in green-houses to preserve them from the cold. It is therefore probable that other causes also contribute to strip the trees of their foliage. Perhaps they wither, because the root no longer supplies what is necessary for their perspiration; for it is evident that the branches grow in thickness, when they no longer grow in length. When, therefore, the branches continue to grow thick, and the stalks of the leaves do not increase, their fibres must necessarily loosen from the fibres of the branches, and the leaves consequently fall off.

But we must not suppose, that these fallen leaves are entirely lost, and of no use. Reason

and experience teach the contrary. These leaves when they become rotten, make manure for the ground. The snow and rain wash the salts out of them, and convey them to the roots of the trees. It may also be observed, that where the fallen leaves are strewed upon the ground, they preserve the roots of young plants, become a covering for seeds, and keep up a proper degree of warmth and humidity. This is more particularly observable in respect to the leaves of the oak. They afford excellent manure, not only to the tree itself, but also to its shoots; and are very useful for forest pasture, as they increase the growth of the grass on which they fall and decay.—This is so important an advantage, that fallen leaves are never taken up to make dung-hills, unless they are in such abundance in the forests, that the grass is rather choked than nourished by them.

Leaves may serve for manure in different ways. They are spread in stables instead of straw, and make a good litter for cattle; and sometimes they are mixed with other kinds of manure. The mould they produce is particularly useful in gardens, where layers are made of it, which contribute greatly to the growth of fruit and young trees.

But it may be said that the fall of leaves is destructive to a multitude of insects, which live on trees and plants. It is true, that autumn sweeps away whole shoals of insects with their nests; but does it follow that these creatures perish? Why may they not live even on the ground under the

leaves which cover and guard them from the cold?

The fall of the leaf is a striking emblem of the frailty of life, and all earthly things. I am as a falling leaf; death walks by my side: to day I may wither, and to morrow be converted into dust.

The tenure of my existence is brittle as a thread, and in a single moment I may be deprived of all my strength and beauty. A little cold air may terminate my mortal life, and turn my body to its native dust. But if I be enabled to leave behind me the mature fruits of righteousness, I shall die honourably, and leave the world without regret.

OCTOBER XI.

Different Sorts of Earth.

We can only form conjectures respecting the interior of the earth. Those who work in mines have never been able to go lower than nine hundred feet; for if they attempted to go further, the pressure of the air would kill them, even if they could protect themselves from water, which accumulates in proportion to the descent. But what is a depth of nine hundred feet in comparison of the semidiameter of the earth, which is three thousand nine hundred and eighty-two miles? The interior of the earth must necessarily be, in a great measure, unknown to us; for miners

themselves have scarcely penetrated through its first crust. All we know is, that after digging some hundreds of feet in depth, this crust is found to be composed of different strata or beds placed one over another. These beds are much mixed; and their direction, substance, thickness, and respective positions, vary considerably in different places. Generally under the common earth in gardens, white clay and rich earth are found; but sometimes the sand, clay, and marl mix by turns. The manner therefore in which the different beds are classed is rather arbitrary; but in comparing the observations which have been made, the best account appears to be that which divides earths into seven different classes.

Black Earth is composed of putrid vegetable or animal substances; it contains salts and inflammable matter: and is, properly speaking, dung. *Clay*, is more compact than the black earth, and retains water on its surface longer. *Sandy Earth*, is hard, light, and dry; and neither retains water, nor is dissolved in it. It is the worst of all earths, though some plants will grow in it. *Marl* is softer, more mealy, and attracts moisture better. *Bog* or *marshy earth*, contains vitriolic salt, which is too acid for plants. *Chalk* is dry, hard, and calcareous; yet some plants thrive in it. Lastly, *Stony earth*. The smoothest stones, however bare of soil, are yet covered with moss, which is a vegetable production; and birch is known to grow to a considerable height between stones, and in the clefts of rocks.

The Creator has most wisely prepared the dif-

ferent sorts of earth of which the strata are composed. For to mention only the principal advantages which result from them, these different layers of sand, gravel, and light earth, give passage to spring water, which filters in running over them, becomes soft, and then, dispersing on every side, supplies water for general use. These beds are also the reservoirs of springs; and it is remarkable that they are to be found in every country near the surface of the earth, and that they are generally composed of a light earth. If it be sometimes mixed with hard and gravelly soil, it purifies the water so much the more.

In the vegetable kingdom this variety of soils is likewise of great utility; for it is owing to this that herbs, plants, and trees grow of themselves in some countries, while they can only be produced by art in others. All that art can do is to imitate nature, which prepares for the soil the nutritive juices, and the warmth most proper for different plants. Variety of soils will make herbs, trees, and roots, though of the same kind, differ according to the earth they grow in. It often happens in the same soil, that some plants thrive whilst others fail. The same fruit has a different flavour in one country from what it has in another. Plants which have small fibrous roots, without much sap, ought to be sown and planted in a light sandy soil, that the roots may extend themselves without resistance, that the rain may better sink into them, and that they may not meet with too many saline, acid, or oleaginous particles.

It is asserted, that in the space of forty-eight hours, lettuce, cauliflower, salad, &c. may be produced fit to eat, by steeping the seed in brandy, and afterwards putting it into ground mixed with pigeons' dung and lime dust.—Vegetation always requires a prepared soil.

These observations should lead us to acknowledge the wisdom with which God has prepared every soil for the production of plants, and for the benefit of his creatures. How unjust, therefore, would it be to complain of the sterility of certain soils. If there be any which appear less fertile than others, our Creator has compensated that defect by greater advantages, or he has given the inhabitants of such places an adequate degree of skill and industry.

OCTOBER XII.

Wine.

WINE is a gift we owe to the divine goodness, and which ought to excite our admiration and gratitude. God has not only given us bread and other food in abundance, but has also vouchsafed to indulge us in pleasure, and has created the vine, to render our lives the happier, and to be of use to our health.

Other beverages, whether natural or artificial, do not produce these effects in the same degree. Wine alone has the power of banishing sadness, of inspiring that cheerfulness which is indispens-

ably necessary to the well-being of our bodies and minds, and of recruiting our strength when we are exhausted by fatigue. Bread enables a man to act, but wine makes him act with spirit, and renders labour easy. Spirituous liquors cannot spread over the countenance that air of cheerfulness which wine gives it.

Let us here reflect on God, who gave to this salutary juice qualities so superior to the poorness of its origin, and the dryness of its native soil. The Creator has produced these effects by the mixture of oily, saline, and volatile particles, of which all wines are composed.

How greatly is the divine goodness manifested in the abundance and variety of wines granted to us. The different sorts are almost numberless. They vary in colour, smell, taste, quality, and duration. We may say, that there are almost as many sorts of wines as soils; and the Creator has allotted to each country such wines as are best adapted to the climate, as well as to the constitution and way of life of its inhabitants.

But how blameably have men acted in reference to the use of wine! There have been legislators who have severely prohibited it, and this not from consideration for the health and morals of the people, but from false economy, or sometimes merely through fanaticism. It is certain, at least, that it is to these causes united, we must attribute Mahomet's prohibition of this liquor. This objection to wine is so much the more irrational, as most of those who prohibit the use of it do not forbid the eating of grapes. Another fault,

which many are guilty of, is the adulteration of wines, particularly by mixing lime, white lead, and other noxious ingredients with them. The human heart in this displays its worst qualities. Can any thing indeed be more horrid? A poor person, who is sick, tries to relieve his misery, and, out of the pittance his labour affords him, purchases a little wine to recruit his strength, and soften his pains, and they who adulterate wine have the barbarity to aggravate his evils, and to make him still worse, by presenting him poison, which, instead of restoring the health and strength he hoped for, may be the cause of his death. But a still more shameful and deplorable abuse of it is, when men poison themselves by excess. This liquor is a salutary medicine, which supports animal life and the vital spirits; it warms and animates the blood, and restores our strength; but the continual and excessive use of it counteracts all these effects. Wine, thus used, is to the human body what manure is to a garden; it forwards the fruit, but destroys the trees. A wise gardener does not continually enrich his ground; he manures his trees when they require it, and only gives it in proportion to their nature and necessities. This is the proper regimen for wine. Let us always remember it is only given to us to refresh and recruit our spirits; let us never abuse a blessing bestowed upon us by Divine Goodness.

OCTOBER XIII.

Migration of the Birds.

THIS is the season when numbers of the birds, which during summer frequented our fields, woods, and gardens, quit our climate for other countries. There are but few of them which pass the winter with us: the loriot, the woodpecker, the crow, the raven, the sparrow, the wren, the partridge, and the thrush, are the principal. The rest leave us almost the whole winter. This migration is wonderful in all respects; and if we have not much attended to these creatures while they were with us, let us at least think of them now they are taking their leave of us. Perhaps it may engage us to notice them more attentively when they return in spring.

Some sorts of birds, without taking their flight very high, and without separating from each other, draw gradually towards the south, to seek the seeds and fruits they prefer; but they soon return back. Others, which are called birds of passage, collect together at certain seasons, and fly in large bodies to other climates. Some are content with going from one country to another, where the air and food draw them at certain seasons. Others cross the seas, and undertake voyages of a surprising length. The birds of passage most known, are quails, swallows, wild-ducks, plovers, woodcocks, and cranes, with some

some others which feed on worms. The quails in spring migrate from Africa to Europe, in order to enjoy a more moderate heat. They fly in flocks, like clouds, and often fall through fatigue into ships, where they are easily taken. Swallows pursue a different method: some cross the seas, but many of them stay in Europe, and hide themselves in holes under ground, or in marshes, fastening themselves to one another, claw against claw, and bill against bill. They also pile themselves in heaps, out of the way of men and animals. Wild-geese and cranes, at the approach of winter, seek milder climates. They all assemble on a certain day, and divide company. They generally form themselves into two lines united in a point like two sides of a triangle, with a bird at their head, and the rest in rows, which always extend in that manner. The goose, or crane, which forms the point, cuts the air, and makes way for those which follow; and these always lay their bills on the tails of those which go before. The leader is only charged with this commission for a time; he goes from the point to the tail in order to rest, and is relieved by another. But all birds of passage do not assemble in flights. Some travel quite alone, or only in company with their mates and families; while others unite in small bodies. Their journeys are performed in a very short space of time; for it has been computed that they can go two hundred miles, and only fly six hours in the day, supposing them to rest occasionally in the day as well as at night. According to this calculation,

they pass from our climate to the equinoctial line, in seven or eight days; and this has been confirmed by observation; swallows having been seen on the coast of Senegal, eight or nine days after their departure from Europe.

These migrations of birds cannot be too much admired. The difference of heat and cold, and the want of food, undoubtedly warn them to change their place. But what is the reason, that when the air is so mild that they might still remain in it, and find a sufficiency of food, they never fail to go at the appointed time? How do they know that they shall find food, and the proper degree of heat, in other climates? Why do they all quit us at the same time, as if they had previously and unanimously fixed the day of their departure? And how, without knowing the country, or the climate through which they travel, do they pursue their course with uninterrupted perseverance? These and many similar questions that might be asked upon this interesting subject, are perplexing and cannot be answered in a satisfactory manner; because we are not sufficiently acquainted with the nature and instinct of these animals. We may, however, behold in these migrations the wise and beneficent direction of Providence. What wonderful means are made use of to preserve and give food to certain birds? With what tender care is their subsistence pointed out when it fails them in some regions! Let us thence learn that every thing throughout the vast empire of nature, is planned with infinite wisdom. Is not instinct to the birds of passage what reason is to

man? And does it not equally instruct them in this point of changing place in proper seasons? How should we blush at our incredulity, our doubts, and our anxieties, when we reflect on the admirable guidance of Providence. Will not that God who guides the fowls of the air, evince an equal tenderness for creatures whom he has endued with reason? Can man, the king of animals, be less an object of Jehovah's care than they? Let us joyfully confide in his merciful protection. Let us walk in his ways, and we cannot fail of happiness.

OCTOBER XIV.

Variety of Trees.

THE same diversity may be observed among trees as appears in other parts of the vegetable kingdom. Some, as the oak, are distinguished by their strength and hardness; others, as the elm and fir, are tall and slender; and others, as the thorn and box tree, never attain to any considerable height. Some have a rough and uneven bark; while others are smooth and fine, as the birch, the maple, and the poplar. Some are used to adorn the apartments of the opulent, while others serve for common and more necessary purposes. Some are so slight and delicate that the least wind might blow them down; while others stand unshaken, and resist the violence of the northern blasts. Some grow to a

prodigious height and thickness, and each year for more than a century, has augmented their size: others acquire their full growth in a few years.

Pliny admired trees out of the bark of which boats were constructed capable of holding thirty persons. What then would he have said of those trees of Congo, which may be hollowed into vessels large enough for two hundred men; or of trees which, according to the accounts of travellers, are eleven feet in diameter, and upon which they can carry from 40 to 50,000lbs. weight? There is one of this kind at Malabar, which is said to be fifty feet in circumference. The cocoa-tree is of this kind, and some of them have leaves large enough to cover twenty people. The *tallipot*, a tree which grows in the island of Ceylon, and in height resembles the mast of a ship, is equally famous for its leaves, which are so large that it is said one of them will shelter fifteen or twenty men from the rain. They are so supple when dried, that they may be folded up like fans, and are then extremely light, and appear no thicker than a man's arm. There are still, on Mount Lebanon, twenty-three old cedars which are said to have escaped the deluge; and, if so, they must be the strongest trees in the world. A learned person, who has seen them, assures us that ten men could not fathom one of these cedars: they must therefore be thirty or thirty-six feet in circumference. But as the gum trees in the American islands are generally twenty-six feet in circumference, we may con-

clude that these cedars are not so old as is reported: though it is well known that many trees live to a very great age. There are apple trees above a thousand years old; and if we compute the quantity of fruit such a tree bears annually, we must, as has been before mentioned, reflect with astonishment upon the prodigious fertility of a single pippin, which could furnish all Europe with trees.

This great variety amongst trees should remind us of the difference we observe amongst men, in regard to their situations in life, their way of thinking, their talents, and the services they perform. As there is not a single tree in a forest which may not be of some use to its owner, so there is no one in society who may not be useful. One, like the oak, gives an example of firmness, and of unshaken constancy, which nothing can move. Another, has not equal fortitude, but has more complaisance and address; he is flexible as the willow, and bends with every breath. If he be virtuous, he will only comply in lawful and innocent points; but, if he be indifferent to his duties, he will always embrace the strongest side.

However different trees may be from each other, they all belong equally to the Sovereign of the world; all are nourished by the same earth; all are warmed by the same sun, and refreshed by the same rain. Would to heaven that all men, however different from each other, would unite in acknowledging that they are all God's creatures, equally subject to his power, equally the objects of his tender mercies, and all indebted to him for

their existence and support, as well as for the talents with which they are endowed. The cedar which rises majestically upon the top of Lebanon, and the bramble which grows at its feet, are equally nourished by the juices of the earth, and the showers of heaven. The divine blessing is also equally necessary to the rich and to the poor. The high and mighty amongst men should always remember that they owe their elevation and greatness to God; that they are supported by him alone; and that, in a single moment, he can overturn and reduce them to dust.

Let us frequently cherish these considerations; as they will tend to repress every emotion of pride which might be in our hearts, and inspire us with submission and obedience to the Author and Preserver of our lives.

OCTOBER XV.

Temperature in different Climates of the Earth.

It seems as if the temperature and warmth of countries must depend upon their situation in respect to the sun; as that luminary casts his rays in the same manner on all countries which are in the same degree of latitude. But experience teaches, that heat and cold, and every temperature, depend on many other circumstances. Seasons may be very different in places under the same parallel; and are, on the contrary, often very similar under different climates. Therefore,

as accidental causes may make the heat very different in the same latitude, and as it is not such as the distance of the sun would seem to promise, it is difficult to determine exactly the seasons and temperature of every country.

The vicinity of the sea, renders the climate milder; of which England and the coasts of Norway afford incontestible proofs. The sea may be frozen near the shore, because it mixes there with fresh water: but this never happens at any considerable distance from land, both on account of the salt contained in the sea, and its continual agitation. Thus, the sea never being cooled down to the freezing point during winter, the adjacent countries enjoy a milder temperature. On the contrary, the more a place is elevated above the sea, the greater is its degree of cold. The air is not only more rare and colder, but the greatest part of the heat produced by the earth's reflecting the rays of the sun falls on low places and valleys, and does not reach heights. Besides, if there be, as some suppose, a subterraneous and central fire, the highest places are most distant from it. Quito is almost under the line; but from its great elevation the heat is very moderate; and it is observable, that such countries have generally a light and serene air, and a pretty equal temperature.

High mountains attract the clouds; hence rains and storms are more frequent in hilly countries than elsewhere: and it has been observed that it scarcely ever rains in the plains of Arabia. Countries which abound in extensive forests are

very cold; the ice melts more slowly in winter, because it is covered with the shade of the trees: it also renders the upper regions of the air cold, and this delays the thaw.

Another circumstance which tempers the heat of warm climates is, that the days are not long, and the sun remains but a little time above the horizon. In colder countries the summer days are very long, which occasions the heat to be greater. The serenity of the sky, the clear light of the moon, and the continuance of twilight, render long nights supportable. Under the torrid zone, the seasons are not so much distinguished by winter and summer, as by dry and wet weather; for when it ought to be summer, that is, when the sun is most above the horizon, and its rays fall in as direct a line as possible, then the rains commence, and fall more or less for some time. But in those countries, the most pleasant season is that in which the sun has the least elevation. In the countries beyond the tropic, the weather is generally more uncertain than in those within the tropics. In spring and autumn the winds are highest. In winter the ground freezes more or less deep, but seldom in our climate beyond three feet. In more northern countries, it freezes deeper in winter, and only thaws a few feet in summer. Stagnant waters, and even rivers, are covered with ice, first near the shore, and then over the whole surface of the water. The different qualities of the soil, as they retain more or less of acquired heat, contribute also in some degree to vary the climate.

In all these plans, what wonderful wisdom and goodness appear! In thus regulating the seasons and climates of the different countries, the Creator has rendered every part of the earth habitable. We often form erroneous opinions of the torrid and the frigid zones; and foolishly imagine that the inhabitants of those regions must be the most miserable creatures in the universe. Happily for the world, and for the great satisfaction of all feeling hearts, it is certain that the people of the most distant countries, without even excepting those who live under the line, or near the north pole, enjoy the portion of happiness suited to their nature and destination. Each country has its advantages and inconveniences in such equal proportion, that it would be difficult to decide which of them merits the preference. There is not a corner of the world in which God has not displayed his goodness. All the inhabitants of the earth experience his paternal kindness; and all that breathe derive life, nourishment, and felicity from him.

OCTOBER XVI.

Atmosphere of the Earth.

THE air which surrounds the earth is not so pure and subtle as ether; being loaded with particles or exhalations which are continually rising out of the earth, and particularly from the water. This is called the atmosphere. Its lower region,

or that which is next the earth, is pressed by the upper air, and thence becomes more thick and dense. This is experienced by those who ascend high mountains. Their respiration becomes more difficult in proportion as they ascend. But it is impossible to ascertain the exact height of the atmosphere, because we cannot rise very high in it. Neither can we draw a positive inference, from the duration of twilight, how far this mass of air extends: for, supposing the morning twilight to begin, and that of the evening to end, when the sun is eighteen degrees below the horizon, and that the latter twilight is produced by the rays which strike the earth, and are reflected by the highest parts of the atmosphere, there would still remain many difficulties to be explained. The atmosphere is divided into three regions. The lower region, which is the nearest, extends from the earth to the place where the air is no longer heated by the rays which the earth reflects. The middle region begins where the preceding one ends, and reaches to the summits of the highest mountains, or even to the most elevated clouds, and is the place where hail, rain, and snow collect. This region is much colder than the lower one; for it is only warmed by the rays which fall perpendicularly and in a direct line upon it. The third region is still colder, and reaches from the middle to the extremity of the atmosphere; we cannot, however, precisely ascertain its limits.

The particles which rise out of the earth, and form the atmosphere, are of different kinds;

watery, earthy, metallic, sulphureous, &c. Now, as some abound more than others in certain parts of the earth, it occasions great variety in the air; and this difference is very perceptible even at a little height. A heavy air is more wholesome than a light one, because it promotes the circulation of the blood and insensible perspiration. When the air is heavy, it is generally serene; whereas a light air is always attended with clouds, rain, or snow. Vapours increase the weight of the air; and particularly, when the heat sends them up very high, the air is still light, notwithstanding the aqueous exhalations with which it is filled. Too great a dryness of the air is very injurious to the human body, but this seldom happens except in very sandy countries. A damp air is also very unwholesome, for it relaxes the fibres, stops the insensible perspiration, and if it be warm at the same time, it is apt to occasion putrid disorders. The heat of the air dilates the fluids of the human body, and brings on sweatings, which produce languor and debility. When, on the other hand, the air is too cold, the solids contract, and the fluids thicken, which causes obstructions and inflammations. The best air, therefore, is that which is neither too heavy nor too light, neither too dry nor too moist, and which is not mixed with noxious vapours.

It is in the atmosphere that clouds, rain, snow, dew, thunder, and several aerial phenomena are formed. It is to the atmosphere also that we owe the morning and evening twilights. As the rays

of light are refracted and reflected in this mass of air, we see them before the sun appears, and enjoy them after he has set. Hence it is that those people who live under the polar circles, enjoy some rays of light even when the sun is for a long time below their horizon.

The atmosphere is the mansion of the winds, which have such influence on the fertility of the earth, and on the health of mankind. Cities and provinces would soon be depopulated and changed into melancholy deserts, if the air were constantly calm, and if there were not storms and tempests to purify it, and to disperse those noxious vapours which are continually rising into the atmosphere.

How much reason have we to bless God for these beneficial arrangements. If there were no atmosphere, or if it were different from what it is, our globe would be a chaos, a most melancholy abode for its inhabitants. Let us then acknowledge with gratitude the wisdom and goodness of the Creator, who has regulated every thing in nature so as to be most conducive to the happiness of the beings he has formed.

OCTOBER XVII.

Proportion between Births and Deaths.

THAT God has not abandoned the lives of men and the preservation of the human race to blind chance, but that he watches over them with parental care, appears evidently from the exact proportion there has ever been, at all times and in all countries, among mankind, in respect to their entrance into the world, and their departure from it. By means of this balance, the earth is neither too thinly peopled, nor too full of inhabitants.

The number of births generally exceeds that of deaths; for it has been computed that if ten persons die annually, twelve or thirteen are born. Thus the human race is continually multiplying. If it were otherwise, if the number of deaths exceeded that of births, a country must of course be depopulated at the end of a few centuries; particularly as many obstacles may prevent population, such as the plague, war, famine, celibacy, and crowded cities, where at least as many die as are born.

It appears from baptismal registers, that more males than females are born, the proportion being nearly twenty-one to twenty: so that where a thousand and fifty males are born, there are only a thousand females. But death, war, and various accidents, preserve an equality between the sexes.

In cities there are generally more women than men, but in the country the males preponderate.

The number of children in families is also regulated with great wisdom. It is computed, that in sixty-six families, there are but ten children baptized annually. In a populous country, out of fifty or fifty-four persons, there is but one married every year; and each marriage, one with another, produces four children; but in cities, we generally reckon but twenty-five children from ten marriages. A fourth part of every country is composed of men fit to bear arms.

By comparing the bills of mortality in different countries, it is found that in common years, that is, when no epidemic disorder prevails, there dies one out of forty in villages; one out of thirty-two in small towns; one out of twenty-eight in middling towns; one out of twenty-four in populous cities; and one out of thirty-six in a whole province. Out of a thousand people, twenty-eight die annually. Of a hundred children that die in one year, three are always still born; but scarcely one in two hundred die in the birth. It is computed that but one woman out of a hundred and fifteen dies in child-bed; and but one out of four hundred dies in labour.

The greatest mortality among children is in the first year. Out of a thousand infants two hundred and ninety-three die before they have attained a year's growth; but between the first and second year of their age, only eighty out of a thousand die; and in the thirteenth, fourteenth, and fifteenth years, the number of deaths is so

small, that it seldom amounts to more than two in a thousand. This, therefore, is the least dangerous period of life. Some learned men have remarked, that there are more women than men who live to seventy or ninety years, but that there are more men than women who exceed ninety and live to a hundred.

Three thousand millions of people at least might live at the same time on this earth: but there is scarcely one third of that number, or at most a thousand and eighty millions; that is to say, six hundred and fifty millions in Asia, a hundred and fifty millions in Africa, a hundred and fifty millions in America, and a hundred and thirty millions in Europe. Hence we may naturally infer, that God is tenderly concerned for the lives of men, and that they are precious in his sight. Is it possible that such an equality of births and deaths should be preserved, and their proportion continue so regular and constant, at all times and in all places, if Divine Wisdom had not so ordained it?

OCTOBER XVIII.

Ravages in the Kingdom of Nature.

We now see that beautiful nature which, in spring, charmed all our senses, and afforded us such variety of pleasures, subjected to the common law of all created things. Its beauty has disappeared, and each day brings new revolutions, one more melancholy than another. But such is the

lot of nature. It contains within itself the sources of the most afflicting devastations.

How much mischief is occasioned by the overflowing of rivers, heavy rains, and the melting of snow and ice! Whole villages overflowed, fruit-trees torn up by the roots, crops of corn laid under water, and flocks destroyed, exhibit sad monuments of the destructive power of the elements. A shipwreck appears to be a less fatal disaster; but a whole commonwealth might have been produced from the men the sea has swallowed up. Immense sums, which required ages perhaps to collect, are lost in a moment. The appearance of the stormy sea, the lamentable cries of the dying, and the crash of the vessel against some hidden rock—how awful! how dreadfully terrific!

What calamities proceed also from excessive heat and long continued drought! The grass and the plants wither, the earth is dried up, and we are stifled with clouds of burning dust. The waters gradually corrupt, and become a poison to the flocks. Heat and putrefaction multiply insects prodigiously, and lay waste all before them: they devour the country, and if thousands die to day, new generations appear to-morrow. Famine, the horrible companion of death, comes next, and the pestilence walks by its side. One bad year, a war, or an infectious disorder, may cause all these evils.

What confusion and destruction are occasioned by earthquakes, which become more and more common! In the very bowels of the earth pesti-

lential vapours boil up, and a destructive fire spreads death on every side. Often on a sudden, in the middle of the night, the earth rumbles and quakes, whole cities are overthrown, and thousands of people are swallowed up. What a formidable sight is a volcano! Nature, which, in other respects, is so lovely, here becomes terrible. At this dreadful scene, I say to myself, How imperfect is every thing but the Creator himself! Many people make nature their god, and its beauties cause them to forget the Great Being, from whom they proceed. Let us learn the true state of all earthly things, and acknowledge the advantages which the love of God has beyond all sublunary objects of attraction. To find delight in the contemplation of his divine attributes, and to consider him as our sovereign good, is to triumph over all the desolations of nature. Besides, what can be more proper to increase our love and gratitude, than the recollection that he can convert even these calamities into blessings. These apparent disorders of nature prevent evils infinitely worse, which would happen if destructive matter, such as subterraneous fires and vapours, were to remain heaped up and confined in the bowels of the earth.

Burning heats serve to dry the earth, which is in other parts overflowed with water. Plague and famine deliver the world from a multitude of wicked people that are a burden to it; and the extraordinary mortality which sometimes happens amongst men, is a very wise mean of preserving the proper balance in respect to number,

and of preventing an excessive population. Nevertheless, we may suppose that God would send fewer plagues on the earth, if his holiness and justice did not oblige him, from time to time, to punish the crimes of its inhabitants.

When we are mere spectators of the mischiefs that happen on our globe, and are not immediately interested in them, our gratitude to that Great Being who has spared *us*, ought to be attended with sentiments of compassion and charity towards our unfortunate fellow-creatures. Let us never be insensible to the misfortunes of others, nor hear with indifference the calamities of people the most remote; as if nothing were to affect us but that in which we had a personal concern. In the immense chain of events in the world, there is not a single link to which we do not each of us belong more or less nearly. Were the unfortunate people who suffered so many miseries greater sinners than ourselves? Why are they fallen while we are preserved? Is the place we inhabit less sullied with crimes than the countries where earthquakes and volcanoes have made such ravages? The final catastrophe of nature will be still in another manner terrible to us. This world is not eternal. After having successively experienced evils of every kind, the moment of its total dissolution will at last arrive. Nature still flourishes, but she visibly grows old. It is only with labour and industry that we draw from the earth what it spontaneously presented to our ancestors, and what they gathered almost without trouble. Let it perish then, this land of

our pilgrimage, since it is designed to perish. We have no permanent abode here, but let us seek that which is to come in the kingdom of God.

Those countries, towns, and villages which have been laid waste, have a claim upon our feelings and our generosity; we should ever be ready to succour them, and divide our bread with the unfortunate inhabitants. May they humble themselves under the mighty hand of God, and patiently submit to the chastisements he has seen proper to inflict. Let them call to mind the distresses that have been endured by many of their brethren, whose wounds are now healed, whose granaries are more amply filled than ever, and whose ruinated houses are now changed into magnificent palaces.

To create and to destroy is, and ever will be, the prerogative of Jehovah. If he never destroyed, we should see no new creations. We should have no trials for resignation or patience. Nor should we be so sensible of the value of religion, which strengthens and consoles in the worst calamities, and which raises us above all the evils of life. Let us then hold by this, and let this be the result of all our reflections.

OCTOBER XIX.

Circulation of the Blood.

Of all the motions in the animal body none is more important, nor more mysterious, than the circulation of the blood. There is something so great in this motion that it strikes the mind, and makes us sensibly feel the limits of human knowledge, while it inspires us with a profound admiration for the supreme wisdom of our divine Creator.

The blood circulates continually in our body; and this is the principle of its motion.—The heart, which is situated within the breast, between the two lobes of the lungs, is a fleshy substance which has two cavities, separated from each other by a partition. This machine is in continual motion, contracting and dilating alternately. From the left ventricle of the heart proceeds the trunk of an artery called the aorta, or great artery. It soon divides into several branches, some descending and others ascending. These numberless branches, which become smaller and finer in proportion as they are farther removed from the heart, spread, and are dispersed over every part of the body. The right ventricle, by contracting, drives the blood into these arteries with so much force, that it reaches to the extremities of the very smallest and most remote branches. This motion, called the pulse, is the effect of the pulsation of the heart, and is

quicker or slower, according as the heart contracts with more or less frequency. But what becomes of the blood when it has reached the farthest branches of the arteries, which are spread throughout the whole body? Nature employs it in the wisest manner. Certain vessels through which the blood circulates absorb the aqueous particles, others the oily, and others the saline. In different parts of the body, where the arteries are dispersed, the secretion is formed of the milk, fat, or any other humour necessary for certain purposes, or which, as useless, ought to be expelled from the body. The remainder of the blood, after being thus purified, flows into the extremities of the arteries in such a manner, that, with the help of a microscope the little red globules may be seen very distinctly rolling one after another.

But these little channels enlarge gradually, form larger vessels, and then larger still, called veins, through which the blood is conveyed back to the heart, in the same way as it had been conveyed from it through the arteries. These veins bring back the blood from all parts of the body, above and below, into the heart, where they form a channel, through which the blood again discharges itself into the right ventricle. It does not pass immediately from this into the right ventricle, but the contraction of the heart forces it into the artery which leads to the lungs, through a number of little branches. Here the blood which has circulated through the whole body, and has acquired a degree of warmth by its agita-

tion, must, before it begins circulating again, be cooled by the fresh air which is brought into the lungs by inspiration. By means of this cooling it condenses again, for during the circulation it had been extremely dilated by heat. It is afterwards received by the pulmonary veins, which lead it to the left auricle of the heart. This restores it to the left ventricle, which, by contracting, forces it again into the aorta; and thus it is dispersed through all parts of the body. In this manner the blood circulates, passing from the heart to the extremities of the body through the arteries, and returning back to the heart through the veins.

Such is the admirable mechanism of the circulation of the blood; but the human mind cannot perfectly explain this master-piece of Divine Wisdom. For example, is it not wonderful, that the motion of the heart should continue without interruption for seventy, eighty, or a hundred years, and that so delicate a machine should not fall to pieces, or wear out? The blood circulates in the human body twenty-four times in an hour, and consequently 576 times in twenty-four hours; and as, at each pulsation, the heart forces two ounces of blood into the aorta, it is evident that 7200 ounces, which is 600 pounds of blood, pass through the heart in the space of an hour. This alone is sufficient to strike us with astonishment. But there may be many other extraordinary circumstances in this circulation of which we have very imperfect ideas. In a word, "man, whose sway all things here below yield to, is a wonderful composition. The most admirable mechanism

and bodily perfection unite in him. Every limb proclaims him lord of the creation. An innumerable number of invisible channels, formed and measured in a manner infinitely surpassing the art and skill of man, convey, disperse, and cause to flow regularly, and without interruption, this precious fluid on which life depends. In this universal motion, in this continual flux and reflux, all is regular and well ordered; every thing is in its place, and in the most perfect harmony; nothing is discordant; nothing is in the way; nothing interrupts nor precipitates its course." This admirable circulation which is observed in all animals, takes place also throughout all nature. The sun, moon, and stars run the course prescribed them, in a regular, determined motion. Not only the air is in a perpetual motion, but it circulates round the earth continually, and the water also flows without interruption. The rivers fall into the sea, and from the vast surface of the ocean rise vapours, which form into clouds. These spread again in rains, which penetrate into the mountains, fill the springs with water, which insensibly increase, and become rivers, and then return again to swell the ocean. The ever-fruitful earth annually produces plants and corn, yet is never exhausted, because the continual circulation of nutritive juices repairs her losses, and restores to her what she had given to us.

All these revolutions of nature lead us to a First Cause, who has so regulated the world, that all beings are continually in action. They cir-

culate, act, and move in an insensible labyrinth of changes, till they return to their former place, and recommence the course marked out for them.

OCTOBER XX.

Proportions of different parts of the Human Body.

God has formed the human body according to the wisest plan, and has observed the most exact proportion even in the minutest part. To be convinced of this we need only calculate the height and breadth of the human body by certain specific measures. The height of the body is generally divided into ten equal parts, which, in technical language, are called *faces;* because the human face was the first model of these admeasurements.

The first face takes in the whole of the visage, beginning at the root of the hair above the forehead; from which point to the top of the head there is still one third of the face in height; or, which is the same thing, a length equal to that of the nose: so that from the crown of the head to the point of the chin, there is the length of one face and a third. Between the bottom of the chin and the hollow of the collar bones, there are two thirds of a face. Thus, the height from the collar bones to the crown of the head, makes twice the length of the face; which is the fifth part of the whole length of the body. From the collar bones to the bottom of the breast, is

reckoned another face. Below the breast, begins the fourth face, which ends at the navel; and the fifth extends to the bottom of the abdomen, which makes altogether half the length of the body. The length of the thigh is equal to two faces, and that of the knee to half a face. The leg, from below the knee to the instep, is the length of two faces; which in all make up nine and a half; and from the instep to the sole of the foot is half a face; which completes the ten faces into which the human body has been divided.

This division is meant to apply to men in general; but in persons of greater height than ordinary, about half a face more is found between the breast and the bottom of the abdomen: and it is the superior length in this part which constitutes a fine stature. When the arms are stretched out in a direct horizontal line, the distance between the extremities of the longest finger of each hand is equal to the height of the body. From the hollow between the collar bones, to the joint which unites the shoulder bone to the arm, is the length of one face. When the arm hangs down, it is computed at four faces; two from the shoulder joint to the elbow, and two from the elbow to the tip of the little finger, which makes five faces for each arm; in all ten faces, which is the length of the whole body. The hand is one face in length. The thumb is the third of a face, or the length of the nose, which is equal to that of the great toe. The sole of the foot is equal to a sixth part of the height of the whole body. There is a particular mea-

sure also for the thickness of the body and limbs. The thickness of the finger is generally the thirty-sixth part of its length; that of the little finger is the forty-eighth part: three times the thickness of the thumb gives that of the hand; and six times the thickness of the hand equals that of the whole body.

The height of the human body varies considerably. The finest stature is from five feet four or five, to five feet eight or nine inches. The middle size is from five feet one inch to five feet four. The least size is under five feet. Women are generally two or three inches shorter than men. Their breast is higher and more prominent, so that the capacity of the chest formed by the ribs is deeper in women, and broader in men, in proportion to the rest of the body. The hips of women are much wider than those of men, and the bones which, joined to them, form what is called the pelvis, are larger.

Man has a greater quantity of brain than any other animal of the same size; even more than the horse or the ox. A man who weighs a hundred pounds has generally four pounds of brain. Children born at the due time generally weigh eight pounds at most, and five at the least. Their greatest length is one foot eleven inches, and the least is one foot six inches.

The human body, whether it be considered in the whole, or in its different parts, appears to be constructed according to the most exact proportions. All is regular, and in the most perfect harmony, as well with respect to size and form

as to the disposition of the parts. There are none greater or smaller than the connexion they have with the other limbs, or the general design of the whole machine, requires. No form or position could be imagined better adapted, or more advantageous to the whole of the members. There are confessedly varieties and irregularities among them, which do not destroy the principal design of the body. Deformed persons and monsters are proofs of these irregularities. But though certain disproportions in the size, form, and disposition of the parts, may be compatible with the chief design, they still hurt the grace and beauty of the outward appearance. How grateful then should those persons be who are well made, and whose limbs are all well proportioned!

OCTOBER XXI.

Navigation.

To a contemplative mind navigation is a subject which may give rise to many important reflections. Here our curiosity is excited, and at the same time satisfied in several ways, so as to be a source of great pleasure. In general, we only consider the advantages which result from navigation; but we ought to consider also the mechanism and motion of the vessels by which it is performed.

Is it not astonishing, that so enormous and heavy a mass as a ship can float on the water? The weight of a ship is greater than we imagine,

and a little attention will convince us, that its pressure on the water must be prodigious. A man of war, which carries eight hundred men, has commonly provisions laid in to support that number for three months, and mounts from seventy to a hundred guns. Now supposing each man to weigh only 100lbs. and each cannon 900 (though some of these weigh more than 4000lbs.) and allowing that each man consumes but three pounds of food in the course of a day; even this moderate calculation will make a total weight of more than three hundred thousand pounds. Besides this, we must reckon the weight of the vessel, the rigging, and a variety of materials necessary to keep the ship in repair, to load the guns, &c. all which equal, if not exceed the former amount. Yet this enormous mass of 600,000 pounds weight, is put in motion by a gentle breeze. Is not this inconceivable? and does it not appear contrary to the laws of nature? Yet it is in reality so natural, that it would be a miracle were it otherwise.

It is not merely the wind that moves this enormous load. The ship with all its weight swims upon the water. But how can so heavy a body float, or how can the water, whose particles are not strongly connected, have sufficient strength and consistency to support this ponderous mass? This is an effect of equilibrium. The vessel sinks till the volume of water which it displaces is equal to its own bulk. Suppose the ship a hundred and twenty feet long, and fifteen broad, and that it sinks to the depth of two feet,

that is, three thousand six hundred feet of water, or so much cargo, as one takes place of the other. Thus the river is no more loaded by the ship than it was by the water which the vessel has removed.

Navigation was formerly much more dangerous and difficult than it is at present. The ancients did not dare to venture far upon the open sea, but coasted along from shore to shore. But since the invention of the compass, we can cross the sea more securely. Before this valuable discovery, it was a sort of wonder to make even short sea-voyages. In Homer's time it required great preparation, and much deliberation, before the heroes could resolve to cross the Egean sea; and the expedition of Jason and the Argonauts, to the island of Colchis, was considered as a wonderful exploit. The discovery of the compass has enabled us to make the longest voyages. The needle turning constantly to the north, informs the navigator in what region he is, and to what country he directs his course. In the darkest nights, in the most cloudy days, in the midst of the ocean, this instrument serves as a guide, and leads him from one end of the world to another.

Have we ever reflected on the advantages of navigation? And have our reflections induced us to present the tribute of gratitude to our Creator? To navigation we owe, directly or indirectly, many of the necessaries of life. We could not have those spices and medicaments which come to us from different countries, or at

least we could not procure them but with considerable trouble and expense, did not vessels bring them into our ports. To have all our necessaries brought by land would be extremely inconvenient, as will appear from the following calculation. The freight of a ship is reckoned by tons, and a ton is equal to two thousand pounds; therefore a vessel whose burthen is six hundred tons, carries *one million two hundred thousand* pounds weight! Now, allowing a thousand pounds weight to a horse, it would require three hundred and twelve waggons, as many men, and twelve hundred and forty-eight horses, to transport this cargo! How dearly then must we pay, not only for the luxuries, but for many of the common necessaries of life!

Navigation should also be regarded as a signal blessing, as it has been a mean of carrying the gospel of Christ to the remotest countries. Let this consideration inspire us with the most lively gratitude to our Creator. And at the same time let us be thankful that we are not obliged to brave the dangers of the ocean, and to procure the means of subsistence at the continual hazard of our lives. But whilst we live peaceably among our families, at a distance from all these perils, let us not forget to recommend our seafaring brethren to the Divine mercy and protection.

OCTOBER XXII.

Beasts of Burden.

THESE animals are so serviceable to us, and we derive so many advantages from them, that it would be a sort of ingratitude not to examine them with attention.

We generally content ourselves with subduing them for our food, or with training them to supply our want of strength; while, through indolence or ignorance, we neglect to consider them as connected with the whole creation, or to reflect on the wisdom and goodness of the Creator, which appears so evidently in the production of these useful creatures.

Of all domestic animals the horse renders us most service, and does it the most willingly. He suffers himself to be employed in cultivating our ground; and tamely submits to every sort of labour for a frugal and moderate subsistence. He shares with us the pleasures of the chase, and the dangers of war. He is a creature which gives up his being to exist only by the will of another; he even anticipates this will, and by the quickness and precision of his motions, expresses and executes it. He gives himself up entirely to his master; refuses no labour, exerts all his strength, exhausts himself, and sometimes even dies in trying to do more. Nature has given the horse a propensity both to love and fear mankind; and made him very sensible of the caresses which render his

servitude pleasing. The horse is the best proportioned and finest shaped of all animals. Every part of him is elegant and regular. The exact proportions of his head give him a light and lively look, which is still heightened by the beauty of his chest. His carriage is noble, and his step majestic, and every limb seems to announce his animation, strength, courage, and stateliness.

The ox has not the pleasing elegance of the horse; his monstrous head, his legs too thin and too short for the size of his body, the smallness of his ears, his stupid look and heavy walk, are deformities: but these are amply compensated by the services he renders to mankind. He is strong enough to carry heavy loads, and is contented with scanty fare. His blood, his hide, flesh, fat, and horns, may be applied to several uses: and his dung is excellent manure for the ground. The construction of the organs of digestion in this animal is very remarkable. He has four stomachs, the first of which can contain forty or fifty pounds of food; and the third stomach has eighty-eight folds or ridges, which serve to assist digestion: whereas the stomachs of sheep and goats have but thirty-six.

The ass, however void of beauty in appearance, and however despised, has notwithstanding many excellent qualities, and is extremely useful. He is not fiery and impetuous like the horse; but quiet, simple, and always the same. Devoid of pride, he goes smoothly on his way, and carries his load without noise or murmuring. He is temperate both as to the quantity and quality of

his food; being contented with thistles and the very coarsest herbage. He is also patient, vigorous, and indefatigable; and is of continual and essential service to his master.

How is it possible that we can daily employ these animals without reflecting on the Creator, who formed and gave them the means of being so useful to us? It is a circumstance worthy the attention of a reflecting mind, that the number of beasts of burden is infinitely greater than that of wild beasts; for if the increase of the latter equalled that of the former, the earth would soon be laid waste. Can we reflect without gratitude on the goodness of God, who has given us the command of these animals; the strength or skill to subdue them; the right to make use of them; to change as we please their nature; to force them to obedience; and to employ them as we think proper? This power is a gift from God, by which man may every instant perceive the excellence of his being. If God had not impressed animals with a natural fear of mankind, it would be impossible to subdue them by force. Since, therefore, it is to Him alone we owe our power over them, we should be unpardonable to abuse it, by treating them with cruelty, or oppressing them by excessive labour.

OCTOBER XXIII.

Winter Seed Time.

A GREAT part of the food designed both for man and animals is at this time deposited in the earth; and when the husbandman has sown his winter's corn, he begins to enjoy a little repose. He will soon have the satisfaction of seeing his fields gradually covered with a beautiful verdure, and giving the promise of a plentiful harvest. Nature works in secret, while the seed is opening; but its operations may be discovered by taking some of the grains out of the ground when they are beginning to shoot. Two days after the seed has been sown, it is swelled by the juices, and begins to sprout. The germ is always at one of the ends of the grain; and that part of it which is next the outside is the little root of the future plant. The part turned inwards is the stalk and head of the plant. Twenty-four hours after the corn has been sown, the germ commonly begins to pierce the coat of the grain, and to disengage itself. The root and stalk become visible. The root is at first wrapped up in a sheath, which it bursts open. Some days after, other roots shoot out of the sides. The fifth or sixth day, a green stalk springs up above the ground. It remains some time in that state, till the fine season comes when the ear of corn bursts from the coats which had hitherto protected it from cold and uncertain weather.

All this naturally leads us to reflect on the nature of human life. Our present existence may be considered as the germ of a future life; and our state here as that of our seed-time, when we can discover very little growth. We cannot here behold the fruit in maturity, nor the corn in perfection. The harvest will not be reaped on earth. We live in hope. The husbandman, having sown his field, leaves his seed to corruption, to the rain, the storms, and the heat of the sun; and he sees not what will be the result. This is precisely our situation in regard to spiritual seed. Let us not be vain of what we sow, neither let us be discouraged if we do not reap the fruits of it. Let us not be weary of "sowing to the Spirit;" and perhaps our good works, however trifling in themselves, may have happy consequences hereafter.

Now that our seed is committed to the ground, let us wait patiently and without anxiety, till we reap the fruit of our labour, and, in the mean time, like the pious husbandman, let us beseech God to crown our fields with his blessing.

OCTOBER XXIV.

Particular Providence of God.

It would be a great misfortune for the world if there were any foundation for the opinion of unbelievers, that God's providence is only con-

cerned for the generality of beings, for the preservation of the whole species, but not on behalf of individuals. Would a being deserve the name of a God who either could not, or would not, interest himself in the parts of which the whole is composed? For our comfort, we are taught, both by reason and religion, to believe in a God whose providence extends to every creature in particular, and to every part of which that creature is composed.

Let none imagine that it is beneath the dignity of God to attend to individuals. The whole universe, as well as the smallest particle of dust, is nothing in comparison of the Supreme Being. What then can we call little or contemptible? Is there not less difference between one man and whole nations, than there is between them and those immense globes which appear so little in the eyes of the common people? The least reflection may convince us, that in the sight of God, to whom a thousand years are as a day, and the whole universe like a drop of water in the ocean, there is nothing either great or small in itself, or any event, however inconsiderable, that is unworthy his attention. If we take the meanest plant, or the least insect that can be dissected, we shall discover in the minutest parts of it the same wisdom which shines in the construction of the whole.—The smallest fibre contributes as much to the perfection of the whole plant, as the plant itself contributes to the perfection of the whole species, or the species to the perfection of the universe. But if God has vouchsafed to

form these creatures which appear so despicable, why should it be beneath him to preserve them? And how could the whole be perfect, if the parts were not so; or how could a whole species be preserved, if the individuals were not regarded? Reason alone may teach us this, but revelation confirms it. We learn from thence, that the hairs of our head are numbered. Even our hairs, of which we lose millions in the course of our lives, without missing them, are all numbered. And thence our Saviour draws this conclusion, that with much more reason God interests himself in us, and vouchsafes to honour us with his notice. Let us then adore his providence with the most lively faith and gratitude.

OCTOBER XXV.

The Measure and Division of Time.

TIME is measured and divided according to the revolutions of the celestial bodies, and particularly by those of the sun and moon. Those two globes have most influence on the state of mankind. The course of the moon only serves to measure the time on our earth, but that of the sun regulates the time in all the planets which move round it.

Day is the space of time in which the sun makes an apparent revolution round the earth: or, to speak more strictly, it is the time our earth takes in turning round its own axis. The part

of this time during which the sun is above the horizon is called an artificial day. This is the time of light which is determined by the rising and setting of the sun. The time of darkness, or when the sun is below the horizon, we call night. The day and night together make the natural or solar day. This is divided into twenty-four parts, called hours. Each hour is subdivided into sixty equal parts, which are termed minutes; each minute into sixty seconds, and each second into sixty thirds.

This division of the day into hours, minutes, &c. is marked by the motion of the shadow on a sun-dial, or by the hand of a clock. A good sun-dial constantly marks the hour truly, but clocks or watches require to be often regulated. Most Europeans begin their hours of the day at midnight, from which they reckon twelve hours to noon, and twelve more from that to the ensuing midnight. The Italians begin the day at sun-set, and reckon twenty-four hours to the following evening. The Turks begin their day a quarter of an hour after sun-set; from which they reckon twelve equal hours, and, when those are passed, they reckon twelve more to the following evening. The Jews begin the day at sun-set; from which they count twelve equal hours to sun-rise, and as many to sun-set: consequently the hours of their day are longer or shorter than those of the night, in proportion to the length of the day and night.

A week is the space of seven days. A solar month is the time the sun takes in passing through

one sign of the zodiac; but these months do not begin or end exactly when that luminary enters a new sign. The lunar month is the space of time between two new moons, that is to say, twenty-nine days, twelve hours, and forty-four minutes.

The solar year comprises twelve solar months, which is the time the sun takes in traversing the twelve signs of the zodiac; and there are generally reckoned in that time, three hundred and sixty-five days, five hours, forty-eight minutes, and fifty-seven seconds. These years are in use, at present, among all the people in Europe. The lunar year takes in twelve lunar months, or twelve revolutions of the moon round the earth. It is composed of three hundred and fifty-four days, eight hours, and forty-eight minutes. The Jews and Turks still reckon by this; but, in order to make it answer to the solar year, they often intercalate a whole month. Our common year commences ten or twelve days after the sun has entered the sign of Capricorn.

This measure or division of time, however unimportant it may appear in itself, may become of much consequence, by the application of it to the moral life of man. The hours, days, weeks, months, and years of which our earthly life is composed, were given us in order that we should fulfil the design of our existence, by making a good use of our faculties. But how do we employ this precious time? We are too apt to consider minutes and seconds as trifles unworthy of our attention. It is certain, however, that he who does

not reckon minutes, will lavish hours also. But are we more economical of longer periods? If from all the days that are allotted us, we deduct those which are entirely lost with respect to our immortal souls, how little of life will remain! From this calculation may we not reckon that a man of seventy has lost more than fifty years, and that one of fifty could scarcely reckon seven which he has employed for his eternal happiness?

Merciful God! what a melancholy and humiliating thought is this! How many millions of days and hours, granted us, by thy fatherly goodness, for our eternal welfare, have been shamefully consumed in idleness and vice, in giving way to criminal passions, and in injuring our fellow-creatures? With what inconceivable rapidity does time pass away? An hour is irrecoverably lost ere we perceive it; and an hour is a great deal to man, who can easily reckon the hours of his life. "Teach us, O Lord, so to number our days, that we may apply our hearts to wisdom."

OCTOBER XXVI.

The End of Summer.

THE sun is now casting his rays feebly on the earth, and every thing begins to assume a different appearance. The earth, which was lately so beautiful and fruitful, is now becoming poor and barren. We no longer behold that fine enamel of the trees in blossom, the charms of spring, the magnificence of summer, those different tints and shades of verdure in the woods and meads, the purple grapes, nor the golden harvests which crowned our fields. The trees have lost their clothing; the pines, the elms, and oaks, bend with the force of the northern blast. The rays of the sun are too feeble to warm the atmosphere or to penetrate the earth. The fields which have bestowed so much upon us, are at last exhausted, and promise no more for this year. These melancholy changes must necessarily diminish our pleasures. When the earth has lost its beautiful verdure, its lively colours, its brilliancy, and in a manner all its glory; when the fields present nothing but a damp soil and gloomy colours, we lose many of the pleasures which are received through the medium of sight.

When the earth is stripped of its corn, its grass, and its leaves, nothing is to be seen but a rugged and uneven surface. The feathered choristers no longer salute us with their mellifluous songs, nor does any thing recall to the mind of man

that universal gladness which recently prevailed throughout animated nature. Deprived of the music of the birds, he hears nothing but the murmuring of waters, and the whistling of the wind; —monotonous sounds which can only excite unpleasant sensations. The fragrance of the fields is annihilated, and the sense of feeling is pained by the impression of a cold and humid atmosphere.

But in the midst of these melancholy prospects, let us still observe, that nature faithfully fulfils the eternal law prescribed to her, of being useful at all times and in all seasons of the year. Winter draws nigh; the flowers are decaying; and even when the sun shines the earth no longer appears with its usual beauty. Yet the country, stripped and desert as it is, still presents to a feeling mind, the *image* of happiness. We may recollect with gratitude to Heaven, that the fields which are now barren were once covered with corn and plentiful harvests. It is true, the orchards and gardens are now stripped, but the remembrance of what they have bestowed upon us should render us contented while the north wind howls around our habitations.

The fruit trees are stripped of their foliage; the grass of the field is withered; dark clouds obscure the face of the sky; the rain falls in abundance; the roads are impaired, and walking is almost impracticable. The unthinking man repines at this change, but he who is endued with wisdom contemplates it with satisfaction. The dried leaves and withered grass, moistened by the

autumnal rains, form a rich manure to fertilize the ground. This reflection, with the pleasing expectation of spring, must naturally excite our gratitude for the tender mercies of our Creator. Though the earth has lost its beauty and exterior charms, and is exposed to the murmurs of those it has nourished and cheered, it has already begun again to labour secretly within its bosom for their future welfare.

But why is not the moral world equally faithful to fulfil its destination as the natural world? The acorn always produces an oak, and the vine brings forth grapes; why then do not the children of a great man always resemble him? Why have literary men and eminent artists ignorant and stupid descendants? Or why do virtuous parents produce wicked children? In reflecting on this difference we may find several natural causes for it; and we may see that it must happen in the moral, as it does sometimes in the natural world. The best vine, for want of a good temperature, produces sour grapes; and parents respectable for their virtues have children that degenerate from them. In carrying these reflections farther, we may look back upon ourselves, and say, Are not our best days also clouded; and has not the splendor which once surrounded us disappeared, like the leaves of the trees? Perhaps our lot in this world has its seasons; if it be so, we should in the dull winter of life have recourse to the provisions laid up in the days of prosperity; and endeavour to make a good use of the fruits of education and experience;—happy

if, at the close of life, we can carry with us to the grave the merit of having lived to the honour of God and for the good of society.

OCTOBER XXVII.

Magnificence of God in the Works of the Creation.

"God has manifested himself in the creation as a Being infinitely wise." There is no creature, however insignificant it may appear, that has not its particular destination; and all animals are formed in the manner best adapted to the purpose of their existence. This we know with certainty of those we are acquainted with, and we may conclude the same of the rest by analogy. If we begin with the sun and descend to the smallest worm or plant, we shall be compelled to acknowledge, that, to be properly adapted to the end for which they are designed, these creatures could not be formed differently, and that for the purpose they are to answer they have no defect. The most minute parts of each creature are evidently adapted to its use, and serve for the functions which God has prescribed, and the whole animal would be defective, and would but imperfectly answer the purpose of its existence, if any one of its parts were injured or taken away. How wonderful is the *whole* which results from the connexion between all creatures in general! Each is in its place, each has its proper functions, and none of these could fail, without causing an

imperfection in the whole. When, therefore, we represent to ourselves the Being who formed this innumerable multitude of creatures animate and inanimate; who has not only designed each of them for certain purposes, but has disposed and arranged every part of them in the manner best adapted to those purposes, so that there is nothing superfluous or wanting; who has, from the connexion between each individual, formed an admirable whole, in which the most perfect harmony prevails; must we not be struck with astonishment, and cry out, "O the depth of the wisdom and goodness of God!"

"In the creation God has manifested himself as a Being infinitely good." What multitudes of animated creatures has his beneficent hand produced! From the beginning of the world mankind have been endeavouring to enumerate all the different beings that inhabit the earth, and yet there are daily discovered new species of them, hitherto unknown. Is not life invaluable to every thing that breathes? Is it not a blessing to the poorest worm? What pleasure then must God have in doing good, seeing he has bestowed on so many creatures the felicity of conscious existence. But of what use would life be, if it were to be immediately taken away? God has ordained that every creature should live as long as was necessary for its destination. He has appointed to each the place it should inhabit, and each finds at its birth all that is requisite for the preservation of its existence.—Many animals are born with instinct and industry sufficient to seek

their own food; others, like mankind, are at first taken care of and taught by their parents. With what an inexhaustible fertility has God endued the earth for the benefit of mankind! Nearly six thousand years have elapsed since she began to support the millions of beings that live upon her productions: and though the world should continue as long again, it cannot be doubted that a sufficient supply of nutriment would be afforded to the succeeding generations.

In addition to the blessing of life, how many enjoyments and pleasing sensations does the Creator grant to animated beings, and particularly to man! How magnificently has he adorned and beautified the world, the place of his habitation! What comforts has he bestowed upon him in social life! What tender ties, what warm affections, and what delightful sentiments, has he created for the heart to enjoy! Let us never be ungrateful to such a bountiful Creator; but since we are endowed with reason, and are capable of knowing and loving him, let us acknowledge, "that the earth is full of the mercies of the Lord."

"In the creation God has manifested himself as a Being of infinite power." This unlimited power, which is visible in all creatures, is particularly so in the two extremes, in the greatest and in the most minute works of the universe. What but an Almighty Hand could have constructed the firmament, that immense extent, that prodigious space which contains such a number of celestial bodies? Who but a Being infinitely powerful could have hitherto preserved this im-

mense fabric, established it so that it cannot be shaken, and yet support it in all its various and appointed motions? Who else could have raised the sun to such a stupendous height, appointed his precise situation, prevented his deviating from it, and supported him without a prop in the immensity of space? Could any thing less than infinite power have given motion to the earth, the moon, and other planets, so that they should invariably revolve in their appointed orbits, and finish and recommence their revolutions at certain appointed periods?

If we consider the Divine Omnipotence in the smallest objects, we shall find it there as incomprehensible as in the largest. Let us cast our eyes on the dust beneath our feet. This dust is inhabited by an innumerable multitude of animals, so small that several millions of them joined together, would not be equal in size to a grain of sand. Yet each of these animals has its exterior and interior parts: each has its sense and feeling: each is indued with a love of life, and possesses an instinct for its own preservation. Behold the grass of the field, the hairs of your head, and the blossoms of the trees; study their construction, their origin, and use; and in all these you will clearly discover the infinite power of Him who forms celestial globes with as much ease as he creates a worm, or causes a flower to spring out of the earth.

Lord, how great and numerous are thy works! They are full of wisdom, and the earth is filled with thy blessings.—May these reflections excite

in us love, respect, and confidence, towards the wisest, best, and most powerful of Beings.

OCTOBER XXVIII.

Laws of Inertion.

INERTION is that power of resistance, by which all bodies are disposed to remain in the state in which they are. When a body is at rest, it resists the motion given to it; but when once put in motion, it persists in it from the same cause, and resists the bodies which would stop its motion, with as much force as it at first resisted the moving powers. Nothing can be wiser than this law which the Creator has established. By this means, bodies move with perfect regularity; and the laws of motion and percussion can be exactly determined.

If the celestial globes had not this power of resistance, they could not move with such order and regularity, but would constantly require a new impulse to keep them in motion. This affords an evident proof that the universe was formed and planned by infinite wisdom. Suppress but a little part of the immense fabric, and the whole would be out of order. Of what use to us would be the construction of plants and animals, or the admirable arrangement of the celestial globes, if those bodies were not susceptible of motion? How simple does this law appear, and yet what wonderful effects result from it! Such

are all the works of the Creator. The principles are of the utmost simplicity, but the whole edifice is so much the more admirable. The universe may be compared to a magnificent palace. The strong and rugged walls on which the building rests appear to have neither elegance nor beauty; yet they are so indispensable, that without them the least motion of air would overturn the edifice. Even these foundation-walls are not totally void of beauty. One should be an architect himself, or be well acquainted with the rules of art, to be able to conceive the pleasure which the symmetry and construction of foundations may afford. None but an artist can know why these foundations are of the depth, width, and length which the architect gave them. He sees they would not be right if they were otherwise; and by knowing how perfect the work is, he enjoys the satisfaction of being able to judge of it. This is exactly the case in contemplating the works of God. Every spectator is not capable of discovering the fundamental laws on which most of the phenomena depend, or of comprehending the wisdom of them. This knowledge is reserved for the true philosopher, and it affords him inexpressible pleasure.

It seems as if there were a certain inertion in the *mind* as well as in matter. Bodies which move constantly the same way, and towards the same point, have a certain tendency to it. The human mind has the same propensity to acts which are often repeated in the same manner.

We might make an excellent use of this natural resisting power of the soul, by making it serve to strengthen us in virtue. Nothing is necessary for this purpose but to repeat frequently the same acts, till we become as much accustomed to good and virtuous actions, as we now are to bad ones. This is so much the more important, as without virtue we can never enjoy true or solid tranquillity. But whence proceed the errors into which we so often fall in this respect? Why do we continually pursue imaginary blessings which lead us to destruction? Our hearts, seduced by the pride which is natural to us, and dazzled by the deceitful appearance of sensual things, cause us to enter the path of virtue with a degree of repugnance. But let us not be discouraged by the violence we are obliged to do to our passions and evil propensities. The wicked themselves are often obliged to restrain theirs, in order to gain some temporal advantage, or to avoid some misfortune. And this constraint, in not yielding to their sensual desires, must be very painful to bad men. On the contrary, how sweet the satisfaction we feel, when our souls resume the command they ought always to have over the senses! A frequent exercise of this command may be a mean of conducting us, under the Divine influence, to that happy state, wherein the soul is in a manner raised above the tumult of passions, and beholds with pity the despicable swarm of the slaves of vice.

OCTOBER XXIX.

The Wants of Man.

THERE is not a creature on earth that has so many wants as man. We come into the world naked, ignorant, and destitute. Nature has not endowed us with that industry, and those instincts, which the beasts possess at their birth; she has only given us the capability of acquiring reason and knowledge. In this respect the animals may appear enviable. Are they not, in reality, happy in having no occasion for the dress, defence, and conveniences which we cannot dispense with; and in not being obliged to invent, or exercise, such a multitude of arts and trades as these several necessaries require? They bring with them at their birth, clothes, arms, and all they want; or they have those natural instincts which, by being implicitly followed, easily procure them. If they require habitations, they know how to dig or build them; if they want beds, covering, or change of clothes, they know how to spin and weave them, and how to part with their old ones; if they have enemies, they are provided with arms to defend themselves; if they are sick or wounded, they know where to find proper remedies. Whilst we, who are so superior to other animals, have more wants and fewer means of supplying them.

It may be asked why the Creator has, in these respects, given the brute creation an advantage

over mankind? And such a question is undoubtedly excusable, if it be not attended with complaint or repining. The divine wisdom is manifested in this, as in all other things. In subjecting man to more wants, God designed that he should continually exercise that reason which is given him for his happiness, and to supply the place of all the resources of other animals. By not having their instinct to assist our numerous wants, we are obliged to make use of our reason, in order to acquire a knowledge of the world and of ourselves. It is necessary to be active, vigilant, and laborious, to preserve us from poverty, pain, and vexation, and to render our lives pleasant and happy. Reason is, at the same time, the only mean to subdue our strong passions, and to prevent us from running into excesses of pleasure, which might be fatal to us. A few examples may convince us of this. If we could obtain, without any trouble, the necessary supply of food, and other wants, we should certainly become indolent, and should pass our lives in shameful sloth. The noblest faculties of man would weaken and grow dull. The bonds of society would be broken, because we should no longer depend on one another. Even children would be able to do without the assistance of their parents, and still less would they want it from others. All human kind would relapse into a state of barbarism; all, like the brutes, would live only for themselves: and there would be neither subordination, mutual obligations, nor kind offices. It is to our wants that we owe the ex-

pansion of our faculties, and the prerogatives of humanity. They awaken the mind, create activity and industry, and render our lives more easy and pleasant than those of other animals. Our wants have made us sociable, rational, and regular in our manners; they have given rise to a multitude of useful arts and sciences. In general, an active and laborious life is beneficial and necessary to man. If his faculties and powers be not exercised, he becomes a load to himself, he falls gradually into stupid ignorance, gross excesses, and all the vices resulting from them. Labour, on the contrary, sets all the machine into a pleasing motion, and gives so much the more satisfaction and enjoyment, as it requires the more industry, reflection, understanding, and knowledge. If, after having been fed with our mother's milk, we required no assistance or instruction, we should only live for ourselves; learning no language, we should make no use of our reason; stupid and profoundly ignorant, we should neither be acquainted with the arts and sciences, nor with the noblest pleasures of the soul: whereas, now, the wants of children, and the destitute state in which they come into the world, oblige the parents, through pity and tenderness, to take care of them; whilst the children, on their parts, are attached to their parents by a sense of their own helpless state and danger, and submit to be guided and formed by their instruction and example, how to make a proper use of their reason, and to respect morality. Thus they may become worthy men and good citizens,

and lead a virtuous and happy life. With such advantages, we may easily give up those which the animals appear to have over us. We require neither furs nor feathers to clothe us; we have no need of teeth and talons to defend us, nor of certain natural instincts to procure those things which are needful for our subsistence and preservation. Such gifts of nature would only degrade or reduce us to a mere state of animal perfection. Our senses, our reason, and our hands, suffice to procure us clothes, arms, food, and all we require for safety, support, or pleasure; and enable us to enjoy all the treasures which nature bestows.

We see therefore, that these wants, of which so many complain, are the true foundations of our happiness, and the best means which Divine Wisdom and Goodness could make use of to direct the faculties of man to the greatest advantage. If we were wise enough to employ them according to these views, we should spare ourselves much misery. There would scarcely be one in a hundred amongst the unhappy, who could attribute his distresses to fortune: and we should confess that there is much more good than evil in the world; that our afflictions are softened by a thousand advantages; and that it is in our power, not only to lead a tolerable, but even a happy life.

OCTOBER XXX.

On Presentiment.

THE faculty of the soul in foreseeing future events appears in such extraordinary ways, that we cannot but be struck with it. The sensations and representations which foresight produces, are so obscure and wrapped up in the mind, that we are not conscious of them. The mind, however, draws very exact consequences from them, and the image of the future presents itself clearly enough to convince the mind which has that preconception. It then forms conjectures and presages, without knowing what led it to do so, and in its astonishment takes them for inspirations. This is what we call presentiment, when without being able to account for our foreseeing some future event, we have an idea more or less clear of it. But it must here be observed, that presentiments are in their nature much fainter representations than sensations; although they cannot be well distinguished when the senses and a warm imagination, put the mind into a violent agitation. But when the soul is calm, the presentiments are more distinct; and this is the reason that they happen generally in the silence of night, in sleep, or in dreams. Man is then sometimes raised above himself; the veil between himself and futurity is drawn aside; and he speaks of future events, while he is scarcely able to see what passes before his eyes.

A number of facts prove, beyond a doubt, that the soul has this faculty of sometimes foreseeing the future; and he must be little versed in the knowledge of nature, who would deny a thing merely because it appears extraordinary or inexplicable. This secret emotion which sometimes warns us of what is to happen, really exists in our souls; and history contains so many examples of this nature, that it is impossible to deny them all. The soul is a representative power of the universe, in respect to the place it occupies in it. It has the faculty of representing the past as well as the present; why then may it not, in the same manner, represent the future, and even contingent events? It may use the same means for this purpose as it did in respect to the past. Provided it has been informed of past events, it can perceive them as if present, and why should we consider it as impossible that it should be informed also of future events? There are in the universe millions of spirits superior to man, who may reveal to him some part of futurity; or there may be in the human mind some power, hitherto unknown, which may enable it to foresee remote events.

But however obscure and inexplicable the causes of presentiments may be, it is enough for us to know, that they may contribute directly or indirectly to our happiness. Sometimes they warn us of danger, sometimes they foretel some pleasing and happy event. In either case, these warnings may be useful to us. We are only to take care that this faculty of the soul, instead

of being a torment to us, may serve to confirm and increase our tranquillity. We must particularly guard against superstition. We must not trust too much to presentiments, or draw rash conclusions from them. We must not suffer them to lead to a neglect of our duties, or a forgetfulness of that God in whom we ought to put our sole trust and confidence.

OCTOBER XXXI.

The Heavens declare the Glory of God.

If we wander in the paths of error and vice, it is certainly not for want of warning or instruction; for whoever is so disposed may find continual opportunities for both. There is scarcely any thing in the universe that is not calculated to inform or correct us. Every thing combines to give us a high idea of the God we adore. Every thing teaches us the respect and obedience we owe him. All his creatures declare his power, his wisdom and glory, in a language very intelligible to those who attend to it. The heavens in particular, and all the heavenly host, the sun, that great principle of life and fecundity, eloquently and loudly celebrate their Divine Creator. These are objects truly worthy the observation of a rational being; and yet they seldom occupy our thoughts. Man, in a state of nature, could have no other guide in searching for his God, than what he drew from beholding the works of nature, and particularly

the structure of the heavens; yet from these alone all nations formed this natural consequence, that there is a God. "When we behold the heavens," says Cicero, "when we contemplate the celestial bodies, can we fail of conviction? must we not acknowledge that there is a Divinity, a perfect Being, a ruling Intelligence which governs, a God who is every where, and directs all by his power? Any body who can doubt this, may as well deny there is a sun that lights us."—"Time," says he in another place, "destroys all false opinions, but it confirms those formed from nature. For this reason, with us as well as with other nations, the worship of the gods, and the holy exercises of religion, increase and grow purer every day." This proves the effect which the contemplation of the heavenly bodies had at all times upon mankind. The royal Psalmist, therefore, might well speak of the heavens as having voice and language, for they compelled all nations to acknowledge them the work of a Supreme Being: "The heavens declare the glory of God." There are two ways of considering the heavens and the firmament; the one general and superficial, the other more particular and with attention. The first is common to all who are endowed with sight. They need only look up and behold the starry sky, with all its beauty and magnificence. The labourer in the field is witness to this admirable scene; and every day he hears the language of the heavens. Though he cannot comprehend the wonderful construction of this firmament which so attracts his sight, nor

is able to make philosophical observations upon it, yet it may lead him to inquire, "What power has formed this vast, this splendid sky? If it be solid, who is the architect? What hand suspended all those luminous bodies at their several distances? and who directs them to move in regular courses? Good sense alone would give rise to these questions; and the same good sense would be sufficient to resolve them. But, if one may venture to use the expression, the heavens have in latter ages been forced to speak a still more intelligible language. There have been extorted from them new demonstrations of the glory of God.

In the first place, the immense expanse astonishes and confounds the imagination. Formerly our idea of it was much more confined. But now that by comparing our earth with the stars, we have found it to be one of the smallest globes in the universe, and that millions of larger spheres occupy the immense expanse, judge what a space is necessary to admit such a number of bodies, among which this sublunary world is but a speck, so as to make their revolutions without interfering or striking against each other. What an idea does even this first observation give us of God's infinite power! How can we reflect on those vast regions without admiring the Being who fills them by his immensity, and whose power extends to the remotest parts of the universe?

Secondly, Let us contemplate the innumerable bodies this great expanse contains, some of which

shine with their own light, others only by a borrowed one. Without deciding any opinion in respect to the fixed stars being suns to light other worlds or not, it is enough for us to know, that God has not made any thing in vain; and consequently all these bodies, both luminous and opaque, are designed for purposes worthy his wisdom. New ones are continually discovered, which had before escaped our limited sight; and of course were not created for us only, as was formerly imagined. The works of the Creator are found to be so numerous, and in such variety, that it would be the height of human pride to suppose our earth the principal to which all the rest belong.

Thirdly, The prodigious, and yet well-regulated distance of the celestial bodies, joined to their reciprocal and regular effect upon each other at that distance, is another source of admiration. If the universe had been the work of chance, if it had not even been formed by the Wisest, as well as most Mighty of Beings, confusion and irregularity must have been discoverable in the plan; but he who measures infinite space with the palm of his hand, placed each globe in the only situation proper for it. The celestial bodies never interrupt each other in their appointed courses, nor prevent their mutual effects. On the contrary, the most perfect harmony subsists between them. If we were only to consider that assemblage which we call our system, we should there behold all the globes of which it is composed, beginning and ending

their courses at certain fixed and regular periods, without ever varying. Thou knowest it, O man! God causes the sun to rise each day. He dispenses the seasons. In the expectation of these vicissitudes, thou art never deceived. What but a God could preside over so many wonders?

Fourthly, In the motion of the earth and celestial bodies, considered simply as mere motion, we find a demonstration of the existence and unlimited power of the Deity. In fact, as all these vast bodies move, they must necessarily have been determined to do so by some Being, by a First Mover. They are by nature inanimate bodies; and not having in themselves the principle of action, they must have received it from a Superior Power. Besides, theirs are not motions directed by chance; they are constant, regular, and periodical.

Lastly, Light and heat are two things which we cannot dispense with, and which we enjoy in proportion to our want of them. Had we been enveloped in perpetual darkness, this world would have been a melancholy prison. Deprived of those rays which give life and fruitfulness to all the productions of nature, we should have been chilled with continual frost. One sun alone has power to animate and quicken the whole earth. In the day it lights us, and then gives place to the dark veil of night. During part of the year it draws near us, in order to produce and ripen the fruits for our nourishment. And during the other part it removes from us, to give time to the earth to rest. Were it nearer to us, it would

set us on fire; were it more remote we should perish with cold. What compass is it that has measured so exactly? What supplies this globe of fire, so that none of its substance is wasted, and it remains entire and unconsumed?

How forcibly does all declare the divine and almighty power of our God!

A Hymn of Praise.

Thou, O Lord, hast created the shining hosts of heaven, and the myriads of blessed spirits which continually surround thy throne. The heavens in their vast extent, and all the splendor with which thou hast adorned them, are only the tabernacle of those sublime beings who know and adore thee.

Thou hast adorned this terraqueous globe with a thousand beauties that delight the mind. The sun which illumines this world, fertilizes the soil, and enriches it with so many blessings, is so firmly established by thy hand that he never wanders from the orbit which thou hast prescribed.

At thy command the moon's paler radiance nightly gleams in the firmament; and wherever we turn our eyes we discover new proofs of thy goodness, and are constrained to acknowledge that thy blessings never cease to visit us.

Springs and unfailing fountains issue forth, to furnish us with a grateful and refreshing beverage. For us the gentle dew irrigates the meadows; while mountains and valleys, fields and forests,

present us with a thousand varied beauties. The whole earth, which thy hand sustains in infinite space, is full of thy riches, crowned with thy goodness, and fertilized by thy bounty.

Let us, without repining, support the afflictions of life; since they are solaced by some moments of present enjoyment, and mitigated by the blessed hope of future felicity. The grand spectacle of nature is well adapted to raise our drooping spirits, and the beams of divine grace are all-sufficient to dry up our tears.

But who can fathom the ways of the Almighty? In this life good and evil walk by the side of each other: earthquakes, tempests, famine, war, and pestilence, disturb the repose of mortals, while death spreads wide his devastations without respect of persons.

A breath overturns us—precipitates us into the tomb, and reduces our bodies to dust. But thanks be to God, we anticipate a new existence, through the adorable Jesus, who has torn away the sting of death, and opened unto us the gates of eternal life!

NOVEMBER I.

Marine Animals.

At first it seems difficult to believe that living creatures are found in the sea. It contains so many different sorts of plants, herbs, trees, and bushes, which so mix and twine together, that it seems as if the paths of the deep must be impassable, and that nothing but disorder and confusion could reign in this savage place. And yet, strange as it may appear at first sight, nothing is more true than that there are living creatures in the sea connected with each other. It is not a few individuals only that the sea contains, but such a number of different species, that we are far from knowing them all, much less can we say how many individuals belong to each species.

In this innumerable multitude of animated beings, there is no confusion; they are easy to be distinguished; and there reigns the same order in the sea as elsewhere. All these creatures may be ranked in certain classes; as they have their particular nature, food, way of life, character, and instincts. There are in the sea, as upon land, gradations, shades, and insensible steps from one species to another. The one begins where the other ends. The stone which is the highest among the minerals, is half of it a plant; the plant which terminates the vegetable kingdom, belongs partly to the animal: and the brute

which forms the link between man and beast, has some conformity with man. So likewise, in the sea, nature proceeds gradually from small to great; each species rises insensibly to perfection; and all are connected by one immense chain, in which no link is wanting.

What a prodigious multitude of inhabitants does the sea contain! What variety amongst them, in their forms, their instinct and destination! Some are so small, that they are scarcely visible; whilst others are so large, that we are terrified at their enormous bulk. Some are entirely destitute of ornament, and so nearly resemble the sea in colour, that they can scarcely be distinguished from it; nature has adorned others with the most lively and beautiful colours. Some species multiply very little, as they would otherwise destroy and devour all the others: some, on the contrary, are wonderfully prolific, in order to serve as food for men and animals.

"O Lord! how wonderful are thy works! in wisdom hast thou made them all."

NOVEMBER 11.

The Wisdom of God in connecting the different Parts of Nature.

As all the members of the human body collectively form one whole, which is constructed and planned with infinite wisdom; so also the different species of natural productions are so many members of which Supreme Wisdom has composed one prefect whole. A slight degree of attention may suffice to convince us, that every thing in nature is linked and connected together, so as to form a perfect system. Different kinds of mineral earths flourish and preserve the vegetable kingdom, without which the animals could not subsist. Fire, water, and air, are indispensably necessary for the preservation of this terrestrial world. There is, therefore, an indissoluble bond between all the beings of which our globe is composed; and it has been demonstrated by naturalists, that this globe itself has necessary connexions with the sun, the planets, and all the creation. But what less than boundless wisdom could combine together such infinite multitudes of different substances, and form them into one? What but this could link together so many millions of different creatures, in such a manner that they should serve for the subsistence of each other?

That we may not lose ourselves in this immense

ocean of the creation, let us only consider, for the present, our own globe, which forms so small a part of the universe. Let us reflect only on what is before our eyes. If we consider the wants common to all animals, we cannot avoid being struck with the admirable harmony which we discover in it. Warmth, air, water, and light, are indispensably necessary for the preservation of all creatures. But there must be a just proportion of them. Too much or too little would be equally injurious, and would reduce nature into a complete chaos. One degree too much in the universal heat would destroy every living creature. For if our earth, taken in the whole, should receive more of the sun's heat, the summer, in every climate, must consequently be hotter than it is at present. Experience tells us, that in all countries the heat is sometimes so intense, that if it were to increase, or to last longer, men and animals would die, and the plants would wither and perish. On the other hand, if we had less heat, it would be as bad; since, even now, the cold is sometimes so severe, that many animals are in danger of being frozen, and some of them actually perish with cold. The earth, therefore, receives the precise degree of heat which is proper for all creatures; and any other would be fatal. There is the same just proportion in the air. The rising of the vapours depends chiefly on the weight of the air, and the rain on its lightness. Now, if the air were not to condense and to rarify alternately, becoming sometimes heavier and sometimes lighter, we

should not have that variety of temperature which is so necessary for the vegetation of plants, and consequently for the support of animals.

If the air were in general heavier than it is, it would be more loaded with vapours, clouds, and fogs, and its humidity would render it unwholesome to men, and injurious to plants and animals. If, on the contrary, it were lighter, the vapours could neither ascend nor collect into the clouds. It is the same in every thing. Nature always observes a proper medium; and as all the elements are regulated in the manner best adapted for the preservation of animals, so are they in perfect harmony with all other natural things. The air not only produces those variations of temperature which are so essential, but it is also the vehicle of sound. It has been appropriated to our ear: and here again appears an admirable wisdom; for if the air were more or less elastic, more dense or more rare, the ear would suffer by it greatly, the soft and pleasing voice of man would resemble claps of thunder, or the hissing of serpents. The air contributes also to the circulation of the blood; it penetrates even the smallest veins. If it were thicker, its force would break every thing; if more rare, it would act too feebly. There are a thousand other connexions that different beings have with the air, and yet it has all the properties which each requires. Now if we consider that many thousands of plants and animals have equal need of air, heat, and light; that each species differs from the

others, and has its peculiar constitution; that it is weaker or stronger than others, and yet that the elements agree equally with all, and supply their different wants; shall we not acknowledge, that a boundless Wisdom, to which nothing is difficult, must have formed this admirable connexion and harmony between so many different beings? In a word, every thing in nature is formed by exact rules, and designed for certain purposes. Not only the trees which rise so majestically, the plants which exhibit such beautiful forms, the fertile fields and meadows, the horse which renders us so many important services, the flocks which feed us, the mines which supply us with ornaments and riches, the sea which furnishes our tables with exquisite fish and conveys us from one region to another, the stars which shed their influence on our globe; not only these brilliant parts of the creation, but even the humblest mosses, shell-fish, and insects, contribute to the perfection of the whole.

Almighty Being! Creator and Preserver of all things! can we contemplate these objects without thinking of thee, and admiring thy wisdom! Without thee, all would be darkness, confusion, and disorder. Without thy salutary influence, there would be neither connexion, harmony, nor pleasure upon earth.

NOVEMBER III.

Bed.

Perhaps during the summer we did not duly appreciate the comforts of a bed; but now that the cold increases every day, we begin to know the value of this blessing. If we were deprived of it in these cold nights, perspiration would be stopped, our health would suffer, and our sleep would neither be so sweet nor so refreshing. In this respect, bed is a considerable benefit to us. But whence comes the warmth we find in it? We should be mistaken, if we supposed it to be the bed which warms. Far from communicating heat to us, it is from us that it receives it. It only prevents the heat which evaporates from our body from being wasted in the air. It confines and concentrates it.

We should be more sensible of this blessing if we considered how many creatures must concur to procure it for us. How many animals furnish us with hair and feathers for the purpose! Supposing a common bed to contain thirty-six pounds of feathers, and that a goose should have but half a pound on its body, the spoils of seventy-two geese would be necessary for one bed. And then, how many hands and materials does it require! It is by such calculations that we learn to know the value of God's blessings. We are apt, in general, to reflect very superficially on the

gifts he bestows upon us; but if we examine into them more minutely, we shall view them in a very different light. Let us reflect, then, on the several parts of which a bed is composed, and we shall be astonished to find, that it requires the work of ten persons at least; that it has cost the lives of as many animals; that the fields must furnish flax for the sheets and quilts; sheep, wool for the blankets; the forests, timber for the bedstead, &c.

Similar reflections may arise from the daily enjoyment of our most common blessings. Our linen, clothes, meat, and drink, in a word, all the necessaries of life can be obtained only by the united concurrence and labour of many persons. Can we then lie down in bed, without grateful sentiments? We have a thousand reasons, at the close of the day, to be thankful to God; but this alone would be sufficient to call forth our gratitude. What sweet repose, what relief, after the fatigues of the day, do we find in bed! In these cold nights there is no warmth, not even with great fires, equally good as that of bed. It gives us, at little expense, warmth and rest. Let us then be thankful whenever we lie down, and remember how valuable a blessing sleep is. We ought to be the more grateful, as there are many of our fellow-creatures who cannot find rest in their beds, or who have no beds to lie on. How much are they to be pitied! How many are exposed, in the open air, to the inclemency of the weather, travelling by sea or

land! How many in prison, or in poor huts, sighing for beds, which they cannot procure. It is probable, that a hundredth part of the inhabitants of every town are in some of these situations. How happy are we in comparison! How many of our fellow-creatures are obliged to watch during the whole night! the soldier on duty, the sailor at sea, &c. But there are still more who, though they have beds, cannot rest on them. Within a very small circle there are many sick persons, who are prevented from sleep by pain; others kept awake by affliction; sinners by remorse of conscience; and unhappy people, whose secret troubles, poverty, and anxieties for the morrow, do not permit them to taste repose. What is then our duty in respect to them? If it be not in our power to relieve them otherwise, let us at least bestow upon them our pity and our prayers. When we go to bed, let us pray for those who have no beds, or who cannot enjoy them; and for those who are deprived of sleep by grief, poverty, or pain. Let us afterwards reflect on our own bed of sickness and death. We shall not always sleep as soundly as we do at present. Nights may come in which we may bathe our couch with tears, and the agonies of death may come upon us; but even these will soon be followed by a sweet and quiet repose. If we be real Christians, we shall sleep tranquilly in the tomb, and awaken with renewed strength to behold the face of our God. In the days of health and prosperity, therefore, let us think of this last bed,

which the earth will afford us; and let us live so as to reflect upon it with pleasure and consolation.

NOVEMBER IV.

Reflections on the past Summer.

THE fine days of summer are gone; and, except the pleasing remembrance of having enjoyed them, nothing remains but emblems of frailty. How is the face of nature changed! The rays of the sun fall faintly through the gloomy clouds upon gardens stripped of flowers, on fields where there are scarcely any traces of harvest, and on hills where little verdure is seen. The air no longer resounds with the melody of birds. The warblers of the grove no longer fill the air with their mellifluous notes, and the mournful silence which universally prevails is only interrupted by the croaking of ravens, and the screams of the birds of passage taking leave of us to seek more temperate climates. The flocks have deserted the adjacent mountains, and the bleating of lambs is no longer heard. How dull and gloomy are the fields which lately appeared so beautiful! Instead of a beautiful verdure, they now offer nothing to the sight but a dead yellowish hue. The clouds are full of chilling rain; and thick clouds obscure the serenity of the morning.

Such are the prospects which nature now presents. Who can behold them without reflect-

ing on the instability of all terrestrial objects? The fine days have disappeared, even while we were preparing to enjoy them. But have we a right to murmur at the dispensations of the Lord? Certainly not. Let us rather recollect the summer days, with the innocent pleasures they afforded, and bless the Ruler of the world for them. What sweet sensations have we enjoyed, what pure delight has filled our souls, when we were occupied in contemplating the beauties of nature, and in watching the mountains and valleys gradually become green; when the thrilling notes of the lark were heard amidst the fleecy clouds, or the plaintive melody of the nightingale poured along the grove; when every passing zephyr was loaded with perfumes, when the morning dawn diffused universal gladness, or when the setting sun gilded the hills and forests with his retiring beams! What rich presents have we received from the gardens, fields, and orchards, equally calculated to gratify our senses and our imagination! Can we reflect on the months that are past, without a sweet emotion, and without blessing the Parent of nature, who has crowned the year with his tender mercies?

We are now living upon the productions of summer and autumn. We have observed how active nature has been during these fine seasons, in fulfilling the Creator's beneficent views in favour of man. How many plants and flowers have grown up in spring! and how plentiful has the autumnal harvest been! The earth has now fulfilled its design for this year, and is going to repose for a

short time. Thus nature is continually active during many months; and even its present rest is not useless: it is silently preparing a new creation.

Here let us pause, and seriously inquire, Have *we* been equally active; have we so employed our time as to be able to show the fruits of it? The husbandman now counts his sheaves: ought we not to count some virtues and good works? Have the pleasures of summer improved our minds, or rendered us more grateful? Have we raised our hearts towards God in the contemplation of nature? What have our employments been in the long summer days? Have we done good to our fellow-creatures? In beholding the sun, the flowers, and so many delightful objects, have we experienced those sentiments which such magnificent scenes ought naturally to inspire? Are we conscious that this summer, has not, like many others, been lost upon us?

We are still blest with existence, and are capable of reflecting on the spring and summer which have passed over; but since the commencement of spring, how many have been removed from the land of the living into the regions of the dead! It is right, O God, our preserver, that we should bless thee for having spared our lives; but let us also recollect, that it is possible we may have seen our *last* summer; and since we must give an account of all the seasons we have passed on earth, let us henceforth endeavour to redeem the time we have formerly lost.

NOVEMBER V.

Inconvenience of the Night.

At this season every night grows longer; and it cannot be denied that this arrangement is in some respects disagreeable. For, though part of the night is designed to refresh and strengthen us by sleep, this very refreshment which we require points out the weakness and decay of our nature. This is the reason that at night all labour is interrupted, not only by the want of light, but also from the necessity of repose, and from the animal strength and spirits being exhausted.

It is therefore natural that the hours of night should appear long and tedious, when we are restless and cannot sleep. With what impatience does the sick man count the hours, and long for the return of morning! Another inconvenience is, that we are exposed to lose our way, or meet disasters. When night has spread her sable mantle over the earth, the traveller wanders, uncertain of his way, and, from his inability to trace the path, falls among briars and thorns, bogs and marshes; or, stepping over some unseen precipice, is plunged into eternity. In the night-time we are also liable to be attacked, either at home or abroad, by wicked people; for darkness is favourable to all sorts of crimes. Another inconvenience is, that the nights are cold; for when the sun is set, and his rays are withdrawn, half the globe is deprived of his enlivening

warmth, as well as of his light; and this renders the long winter nights very disagreeable. Let us add, also, that night continually presents us with an emblem of death.

There is neither constant day nor night upon earth; and though the time of darkness in winter be long, and even in summer the days are regularly divided by darkness, it is however certain, that God has bestowed more light than darkness upon the earth, by means of twilight, and by the light of the moon and stars.

Blessed be the Lord for the light of the moon and the stars, for the rays of the sun, and the splendor of noon-day! But, above all, blessed be his name, for the light which his Gospel has diffused in the midst of error, ignorance, and misery! Let us remember, in our darkest nights, in our hours of sorrow and adversity, that we are advancing towards the regions of perfect light and ineffable joy. If sleep sometimes forsake us in the midst of darkness, if sickness or care force us to count the melancholy hours, let us comfort ourselves with the reflection, that we are not hopelessly buried in eternal night, but that we are approaching towards a celestial kingdom, towards that blessed habitation where there will be no change from light to darkness, and where sickness, care, and sorrow will be for ever unknown.

Blessed be Jehovah that the night of ignorance and misery which envelopes us here below is not eternal. Heaven and everlasting glory will hereafter be the portion of the righteous. Hasten,

thou sun, and ye radiant stars, which illuminate the firmament, hasten to finish your appointed course; that the time of trial, the revolutions of day and night, and the months and years that are allotted me, may be speedily terminated! May I discover, by the eye of faith, the dawn of that glorious day, when the season of darkness which now surrounds me, shall vanish for ever! Blessed morning of eternity, hasten thy appearing, and realize my anxious hopes! I long to wing my flight to the bright abodes of felicity, to the mansions of that celestial city where darkness cannot exist, but where an everlasting day shall shine on the progress of our knowledge and our happiness.

NOVEMBER VI.

Woods and Forests.

Woods form one of the finest pictures which the surface of the earth presents to our view. A superficial observer, indeed, may consider them as mere collections of trees, exhibiting a dreary solitude; but a well-informed person, who terms every thing beautiful which is good and useful, will find in them much matter for agreeable reflection. These scenes are the more interesting at this season, as the fields and gardens are no longer so pleasant as in summer. Nothing invites us more to reflect on the grandeur and beauty of nature than a solitary wood. The

pleasing shade and still silence we enjoy tend to collect our thoughts and awaken the imagination. The number and variety of the trees are the first objects which attract our eyes. They are less distinguished by their difference of height, than by their different stems, forms, and leaves. The resinous pine does not excel in the beauty of its leaves; they are narrow and pointed; but they last a long time, like those of the fir, and they preserve their verdure in winter. The foliage of the linden tree, the ash, and the beech, is much more beautiful and varied. Their verdure is admirable; it relieves and charms the sight, and the broad indented leaves of some of these trees form a fine contrast with the narrow fibrous leaves of others. With their seeds, their mode of propagation, and the utility of their fruits, we are, at present, but imperfectly acquainted. But to what a variety of purposes may their *timber* be applied! The oak, whose growth is very slow, and whose leaves do not appear till those of other trees are completely expanded, affords the hardest and strongest wood; which art has taught the carpenter, joiner, and carver, to work into a variety of useful forms, so durable as in some instances to defy the ravages of time. Lighter wood serves for other purposes; and, as it is more plentiful, and grows quicker, it is also of more general use.

To forest trees we are indebted for our houses, ships, and fuel, with many conveniences for furniture. And the industry of man has taught him to polish, shape, turn, carve, and form wood

into a multitude of things equally elegant and useful.

Divine Wisdom has dispersed woods and forests in more or less abundance all over the earth. In some countries they are at great distances; in others they occupy several leagues of ground, and raise their majestic heads to the clouds. The scarcity of wood in certain countries is compensated by its abundance in others; and it is peculiarly worthy of remark, that neither the continual use which is made of it, the ravages of accidental conflagrations, nor the great quantities consumed in severe winters, have been able to exhaust this rich gift of nature. On the contrary, at the end of twenty years, we may see a forest where we had formerly discovered nothing more than a low copse, or a few scattered trees.

Do we not discover in all this the power and goodness of Almighty God? How superior is his wisdom! If we had assisted at the creation, we should probably have made many objections to woods and forests; we might have preferred orchards and fertile fields. But the infinitely wise Being foresaw the several wants of his creatures in their different situations. It is precisely in countries where the cold is most severe, and where there is most occasion for shipping, that the largest forests are found. From their unequal distribution, a considerable branch of commerce results, and new connexions are formed amongst men. God intended these advantages to mankind when he created forests. He vouchsafed to think

of us before we could feel our wants, and mercifully anticipated our necessities, before we were capable of expressing them. Grant, O Heavenly Father, that we may be duly sensible of so many blessings, and pay the tribute of gratitude, love, and praise, so justly due to thee!

It is not left to man to plant or keep up forests. Most other things are obtained only by labour. The ground must be ploughed, and seeds must be sown, at the expense of much trouble and labour, but God has reserved to himself the trees of the forests. It is he who plants and preserves them, and men have little to do with their cultivation. They grow and multiply independently of our care. They repair their losses continually by new shoots, and there are always enough to supply our wants. To be convinced of this, we need only cast our eye on the seed of the linden tree, the maple, and the elm. From these little seeds vast bodies are produced, which raise their heads to the very clouds. They were planted by the Almighty, and his hand has supported them for ages, against the efforts of winds and tempests. It is God who waters them with dew and rain sufficient to make them annually renew their verdure, and in some measure to keep up a kind of immortality amongst them.

The earth does not create the forests which it bears, nor, to speak correctly, does it nourish them. The verdure, the blossoms, and the seeds, which the trees annually lose and renew, and the sap which is continually dissipating, are losses

which would soon exhaust the earth, if that were the only mean of nourishment: for of itself it is a heavy, dry, and barren mass, that draws from other sources the juices and nutriment with which the plants are supplied. The principles of their growth do not, therefore, proceed from the earth. The air, without our aid, furnishes abundance of salt, oil, fire, and every other substance which trees require.

O man! thou art overloaded with blessings. Lift up thine eyes towards the Great Being who takes pleasure in doing good unto thee. The forests are heralds of his bounty; and thou must be guilty of the basest ingratitude, if thou art insensible to this blessing of which every moment may remind thee.

NOVEMBER VII.

The Sense of Feeling.

It may be said with truth, that feeling is the universal sense of animals, and the foundation of all other sensations; for there can be neither sight, hearing, smell, nor taste, without contact. But as the touch operates differently in seeing from what it does in hearing, and in hearing from what it does in the other organs of sensation, we may distinguish the sense of feeling, properly so called, from that universal sensation above-mentioned. They are both produced through

the medium of the nerves. These, of which anatomists reckon ten principal pair, resemble small cords or threads, and, deriving their origin from the brain, they are distributed through every part of the body to the very extremities. Wherever there are nerves, there are sensations; and wherever the seat of any particular sense is found, there also are these nerves which are the general organs of feeling. There are optic nerves for the eyes, auditory nerves for the ears, olfactory nerves for the nose, and gustatory nerves for the tongue; besides those subservient to the sense of feeling, which, like that sense itself, are spread throughout the whole frame; they proceed from the spinal marrow, pass through the side orifices of the backbone, and thus disperse through all the body.

The nerves which are conducive to the sense of feeling are also found in the parts which serve as organs to all the senses; because, independent of their own peculiar sensation, they must also be susceptible of feeling. Hence it is, that the eyes, ears, nose, and mouth, receive impressions which depend entirely on the touch, and are not produced by their own particular nerves. That the feeling is occasioned by the interposition of nerves, is certain; for each member feels more strongly in proportion to the number of its nerves; and the feeling ceases where there are no nerves, or when the nerves have been cut out. Incisions may be made in the fat, and bones, hair, and nails may be cut off, without exciting pain. The bone is surrounded with a nervous

membrane; and the nails are fastened in a place interwoven with nerves; and it is only when some of these are hurt that pain is felt. Therefore, properly speaking, we should not say we have the tooth-ache, for the tooth being a bone, can have no sensibility: but the nerve attached to it may occasion pain when it is irritated.

Let us here admire the wisdom and goodness of God. In dispensing the sense of feeling throughout the whole body, he evidently ordained it for our good. The other senses are placed in the parts best adapted for their respective uses, and for their preservation. Now, as it was necessary for the security and welfare of the body, that each of its parts should be warned of whatever might be useful or hurtful, agreeable or disagreeable to it, the sense of feeling was spread over the whole body for that purpose. It is another effect of Divine Wisdom, that many species of animals possess a quicker sense of feeling than men; for it is necessary to their mode of life, and compensates for the want of some other senses. How exquisite must the sense of feeling be in a spider, when, in the midst of the web in which it so curiously spins itself up, it perceives the smallest motion which the approach of other insects may occasion.

But, without dwelling on the sense of feeling in animals, it will sufficiently excite our admiration to reflect upon it in mankind. How can the nerves, which appear to us to be only susceptible of more or less thickness, length, tension or vibration, transmit so many different ideas and sensa-

tions to the soul? Can there be such a correspondence between the body and soul, that nerves of a certain construction should produce particular sensations? Has each organ of sense nerves so ordered, so analogous to the corpuscles, to the little particles of matter which issue from bodies, that the impressions they receive from them, should always be followed by certain determinate feelings? It seems as if there were probability in this conjecture, from the pyramidical form of the papillary nerves. But our knowledge is too limited to decide this point; and we must humbly allow, that this is one of those mysteries of nature which we are not permitted to penetrate.

Let us give thanks to God, that together with the other senses with which we are endowed, he has granted us that of feeling. Of how many enjoyments should we be deprived, if our bodies had less sensibility! We could neither discern what would be advantageous to us, nor shun what might prove injurious. Would that our souls had as lively a sense of what is great and good, as our bodies have of pleasure! This moral sense was impressed upon our souls. Though it is much weakened, grant, O Lord! that it may never be effaced.

NOVEMBER VIII.

Remembrance of the blessings we enjoyed in Spring and Summer.

Come, my friends, let us acknowledge the goodness of the Creator. Let us gratefully remember the time we have spent in the bosom of joy, when, free from cares or anxiety, the renewal of nature filled us with delight; when devotion followed us to the verdant bower, and even the shadow of sorrow was banished from our habitations; when, hand in hand, we traversed the flowery paths, and admired on every side the vestiges of creative power, and divine preservation. From the thick bush whose ample foliage had attracted the aerial songsters, the sweetest music burst upon our ears, while friendship, harmony, and guileless mirth, combined to give the highest zest to our enjoyments. Smiling nature dealt out her flowers with a liberal hand, and we inhaled the fragrance of the rose: whilst the pink and wall-flower perfumed the circumambient air, and towards the evening of a fine day the sportive zephyrs wafted us the sweetest exhalations on their airy wings. Then were our souls filled with mild delight, our lips opened in thanksgiving to the Lord, and our voices mixed with the songs of the birds.

Often, when the breath of the wind had cooled the burning heat of the air, and the birds felt

animated with new life; when the clouds were all dispersed, and the great luminary promised a continuance of his unobscured splendor, pleasure lent us wings and we cheerfully quitted the tumultuous city, to rove in the enamelled fields, or repose in the umbrageous bower. There we were perfectly undisturbed; and wisdom, piety, joy, and innocence attended us to this rural asylum. The trees waving with the evening breeze, while they covered us with their shade, diffused the most refreshing coolness; and nature drew forth rich sources of content to pour into our pure hearts. There, entirely given up to the Creator, to nature, and to reflections on our own happiness, our eyes were bathed in tears of joy.

The songs of gladness, which resounded on every side, accustomed our hearts to gratitude. The cheerful bleatings of the well-fed flocks heard from afar; the pleasing sound of the shepherd's pipe; the busy hum of the bees fluttering round the flowers; the hoarse croaking of the frogs, enjoying themselves on the banks of the rivulets; all gave us impressions of pleasure, and raised us gradually to our Creator. We saw and acknowledged his supreme wisdom in the waters, the air, the quadrupeds, the insects, and the rich perfume that exhaled from the surrounding flowers. A landscape gay and cheerful as the abode of our first parents, presented itself to our view. At a distance we perceived the dark shade of ancient forests, and hills gilded by the rays of the sun; whilst the beautiful mixture of various colours, the rural flowers, the golden harvest, the richly embroidered

carpet of nature, the treasures of the fields, the sweet food of the grazing herds, and the bread of man yet green in the ear, unitedly called forth the grateful praises of a feeling heart.

There nature displayed before our eyes the majesty of its Divine Author, and we then said, "This magnificent universe is too beautiful to be the abode of men who can behold it without emotion. For man the wings of the wind bring their refreshing breezes; for him the silver stream murmurs at the hour of noon, when he suspends his labour; for him the corn ripens, and the trees bring forth their fruit: all the creation ministers to his necessities and his pleasures, though he regards it not."

Those, however, who love their God will discover in the zephyr, in the rivulet, in the meads and flowers, in the blade of grass, and the ear of corn, traces of his eternal wisdom, and heralds of his power. The God who created the angel, also formed the minutest grain of sand. It is through him that the mite and the elephant equally exist. At the sight of a blade of grass, as at an aloe, the thinking mind is elevated to its Creator: the muscle, no less than the whale, demonstrates the greatness of the Lord. Are not his powers as great in the breeze of the zephyr as in the storm; in a drop of water as in the ocean; in a spark of fire as in a million of stars? The vast creation is the sanctuary of God, the world is a temple consecrated to his glory, and man was intended to be his priest in nature, and not the tyrant and destroyer of created beings.

NOVEMBER IX.

Foreign Animals.

EVERY part of the world has animals peculiar to itself: and it is for very wise purposes that the Creator has placed them in one country, rather than in another. The most remarkable animals in the southern countries are the elephant and camel. They surpass all other quadrupeds in size. The elephant in particular appears like a moving mountain, and his bones resemble pillars. His head is joined to a very short neck, and armed with two tusks strong enough to tear up trees, or throw them down. A longer neck could not have supported the weight of the head, nor have kept it in an elevated position. But to make amends for the shortness of his neck, the elephant has a very long trunk, which he uses as a hand to convey food to his mouth without being obliged to stoop. He not only moves, bends, and turns it in all directions, as we do our fingers, but he also makes use of it as an organ of smell. His eyes are small in proportion to the size of his body, but they are bright, full of fire, and very expressive. In a state of independence, the elephant, though wild, is neither sanguinary nor fierce. He is of a mild nature, and never makes use of his weapons but in his own defence. He never injures any person without provocation, but when irritated he becomes truly formidable:

he then seizes his enemy with his trunk, jerks him like a stone, and tramples him to death. The elephant eats a hundred pounds of grass in a day; but his body being of an enormous weight, he crushes and destroys with his feet ten times more than he consumes in food. His chief enemy, and often his conqueror, is the rhinoceros, an animal somewhat resembling the wild boar, and which uses the horn upon his nose to pierce the belly of the elephant.

Very little attention is required to perceive the wisdom of God in the production of the elephant. He has ordained that it should breed in countries abounding with grass, and that it should not become a burden to the earth by multiplying too fast. The female bears her young for two years, and does not begin to increase again till the third year.

The camel is one of the most useful animals of the east. It is admirably adapted to bear the greatest fatigues in the midst of barren deserts and burning sands; being able sometimes to live four or five days without drink, and requiring but very little food in proportion to its bulk. It browses the few plants and shrubs that grow in the desert; and when it finds none, two measures of beans and barley serve for a whole day's subsistence. Besides the hump which grows on its back, there is another singularity in its make. It has two gullets, one of which reaches to the stomach, and the other terminates in a bag, which serves as a reservoir. Water remains in this without corrupting; and when the animal is

pressed by thirst, and has occasion to dilute its dry food, it draws up into its paunch part of this water, which moistens the throat, and passes afterwards into the stomach. The ordinary load for a camel is from seven to eight hundred pounds weight, with which it can travel several miles in an hour, and continue for twelve or fifteen hours each day. It may also be remarked that the fleshy foot of the camel is admirably adapted for walking in the sands; whereas the horny hoof of the horse would be hurt or burnt by them.

The most remarkable quadrupeds in the northern countries, are the elk, the sable, and the rein-deer. The first of these animals is large, strong, and finely shaped. Its head somewhat resembles that of the mule in form, size, and colour. Its legs are long and strong, and its hair of a light grey. This animal is simple, stupid, and timorous. It finds food every where; but prefers bark, or the tender shoots of the willow, the birch, or the service-tree. It is extremely agile, and its long legs enable it to go a great way in a very short time.

The sable wanders in the forests of Siberia, and is much prized on account of its beautiful fur. The hunting of this animal is generally the sad occupation of the unfortunate wretches who are banished to the deserts.

The rein-deer is an animal of a pleasing and elegant form, nearly resembling the stag. It seeks its own food, which consists of moss, grass, leaves, and the buds of trees. The inhabitants of the north derive great advantages from it:

they eat its flesh, drink its milk, and, yoking it to a sledge, are drawn over the ice and snow with astonishing celerity. All the wealth of the Laplanders consists in their rein-deer. The skin furnishes them with clothes, beds, coverings, and tents; and, in fact, they derive from these animals all the necessaries of life.

What has been said of these foreign quadrupeds may give rise to important reflections. How prodigious is the distance between the elephant and the mite! And what a wonderful variety is discoverable in the external form of animals, their shape, their organs, their senses, and motions; and yet every thing is perfectly adapted and proportioned to the kind of life ordained them. In many parts of the world there are animals which could not bear the climate, air, food, or temperature of European countries, neither can it be doubted but there are millions of animals which could no more exist on our globe, than we could live in the planet of Saturn or that of Mercury.

Almighty God! how vast and extensive is thy empire! Thou hast formed all species of creatures, fitted for the various regions of nature, and adapted to contribute to the happiness of thy intelligent beings in every part of the globe! Blessed be thy holy name for ever and ever!

NOVEMBER X.

Variety of Winds.

THERE is a great variety of winds. In some places they are constant the whole year, and always blow from the same point. In others they change at certain periods, but always according to fixed and regular laws. At sea, between the tropics, and some degrees beyond them, there is an easterly wind, which continues the whole year without any considerable variation. On the north of the line, the wind blows towards the north-east; and on the south of the line, it blows towards the south-east, more or less, according to the position of the sun. This, however, must be understood of the wind that prevails on the open sea; for if islands or great continents are opposed to it, the direction may be changed to north-east. In the southern parts of the ocean, the wind is generally westerly. The nearer to the coast, the more changeable is the wind, and still more so on land. The constant east wind is chiefly owing to the heat which the sun communicates to our atmosphere. In the Indian seas there are winds called monsoons, or trade winds, which continue to blow in the same direction from three to six months of the year, and during a similar period blow in the opposite direction. The causes of these winds have not hitherto been fully discovered, but we must certainly look for them in the altern-

ations of heat and cold, the position of the sun, the nature of the soil, the inflammation of vapours, the condensation of vapours into rain, and other similar circumstances.

There are seas and countries which have winds and calms peculiar to themselves. In Egypt, and in the Persian Gulf, there often prevails, during the summer, a burning wind, which stops respiration, and consumes every thing exposed to its influence. At the Cape of Good Hope, a cloud is sometimes seen to form, which is called the fatal wind, or the ox-eye. It is at first very small but visibly increases, and soon produces a furious tempest, which swallows up ships, and plunges them into the depth of the sea.

Variable winds which have no fixed direction or duration, prevail over the greatest part of the globe. It is true, that certain winds may blow more frequently in one place than in another; but it is not at any regular time that they either begin or end. They vary in proportion to the different causes which interrupt the equilibrium of the air; heat and cold, rain and fair weather, mountains, straits, capes, and promontories, may contribute very much to interrupt their course, or change their direction. It is also highly probable that other causes unknown to us may have effect in the different modification and alteration of the air.

One thing particularly remarkable, and which daily occurs in almost every place, is that a little before sun-rise, when the air is perfectly calm

and serene, just at the dawn, there comes a quick easterly breeze, which begins at the approach of the sun, and continues some time after he has risen. The cause of this must be, that the air, being heated by the rising sun, rarefies, and, by its dilating, sends the contiguous air towards the west; this necessarily produces an east wind, which afterwards ceases as the surrounding air also becomes heated. From the same cause, the easterly wind must not only precede the sun in the torrid zone, but also be much stronger than in our regions, because the sun acts more moderately upon us than in the vicinity of the line. In the torrid zone, the wind blows constantly from east to west, whilst a westerly wind is rarely felt in these parts.

We may observe, then, that winds are not the effects of chance, to which no cause can be assigned. In this, as in every thing else, the Creator manifests his wisdom and goodness. He has so ordained, that the winds should rise from time to time, and that there should be but very seldom an absolute calm. He regulates the motion, force, and duration of the winds, and prescribes the direction in which they are to blow. Even their variations are extremely beneficial to mankind. When both plants and animals have begun to droop under the influence of a long drought, a wind from the sea-coast, laden with exhalations, waters the meadows, and revives the face of nature. And when this is accomplished, a dry easterly wind restores serenity to the atmosphere, and brings back fair weather. The north wind brings

with it a great quantity of icy particles, and carries off the noxious vapours of autumn. Lastly, to the sharp north, succeeds the southerly wind, which fills the air with an enlivening warmth: and to these continual changes we owe our health, and the fertility of the earth.

Who can make these reflections without adoring God! All the elements are at his command. At his word the storms and tempests roar; they rush from sea to sea, from land to land; and at his command all is calm again. Should we not, therefore, put our whole trust in him? He who directs the winds as he pleases, will he not guide our ways? Whilst at his command all the changes of the wind combine for the good of his creatures, may we not believe that the vicissitudes of life contribute to the real happiness of each individual?

NOVEMBER XI.

The Chase.

HUNTING is one of the chief amusements of a certain class of men at this season; but it is to be wished they did not set such value upon it; for the power man has over animals, and the pleasure he takes in subduing them, is too often mingled with cruelty. Sometimes, indeed, there s a necessity that animals should be put to death, in order to make that use of them for which they are designed, or to prevent an increase that would

be hurtful to us: but even then their death ought to be rendered as easy as possible. Unfortunately, however, this law of nature is very little regarded by the majority of sportsmen; and men, in this respect, show themselves to be more cruel than the most ferocious beasts. How dreadful to every feeling of humanity is the mode of hare and stag hunting! Can it be an innocent pleasure to pursue with implacable fury a poor animal, which flies from us in violent anguish, till, at last, exhausted with terror and fatigue, it falls and expires in horrid convulsions. Is there a human breast that does not bleed at such a picture, or an intelligent being that can behold such a scene without sentiments of regret and compassion? To purchase amusement by the death of a harmless creature, is to purchase it too dearly; and that must be a dangerous pleasure which habituates men to cruelty and barbarity. It is impossible that the heart of a man passionately fond of hunting, should not insensibly lose the sweet feelings of humanity. Such a man soon becomes cruel and ferocious; he finds pleasure in none but scenes of horror and destruction; and having accustomed himself to be insensible towards animals, he soon becomes so towards his fellow-creatures.

Hunting does not appear to me in general an occupation which we can reconcile with the duties we are called upon to fulfil. Without mentioning the loss of time, a loss in itself of consequence, it is certain that hunting dissipates the mind, and fills it with ideas incompatible with serious employments. Gentler amusements are

more proper to unbend and divert the mind, than those tumultuous pleasures which do not leave us the use of reflection. Hunting must ever appear a dangerous employment to a moral and religious man; for ought we not to be afraid of a pleasure which leads to sins and irregularities? How does the health suffer by such violent exercise, and by the sudden transitions from heat to cold! What excesses, what swearing, what cruelties are allowed! How are the horses, dogs, and even the men, treated! What mischief is done to the meadows and fields! Can all these evils be considered as trifles which merit no attention, and which may be allowed without scruple or remorse?

If we were wise, we should seek pleasures more innocent and pure, and such might be easily found. We have only to look around us, and we may every where discover pleasing objects calculated to afford us the sweetest enjoyments. The sky, the earth, the arts and sciences, our senses, the intercourse of friends, in a word, almost every thing around us invite to true and rational enjoyment. Why then should we run after gross pleasures, which always leave remorse and disgust behind them? We have within ourselves an abundant source of pleasures. A number of intellectual and moral faculties, the culture of which may every moment afford the greatest satisfaction. But it is in this that the great knowledge of a Christian philosopher consists: he has the art of being happy without much preparation or trouble, and particularly without being so at the expense of his virtue.

NOVEMBER XII.

Dreams.

THE soul is not so totally inactive during sleep, as to leave our faculties absolutely unemployed. Our imagination is at work, and ideas and images present themselves before us. This is the case when we dream. However, the mind has but little share in them, except as to memory. If we reflect upon our dreams, and examine why they are generally so irregular and unconnected, and why the events they represent are so singular, we shall find that it chiefly proceeds from our being more affected by sensations than by perceptions. They represent to us persons we have never seen, or who have long been dead. These persons appear alive, and we associate them with things actually existing. If the soul acted in our dreams, as it does when we are awake, one moment would set these confused and unconnected ideas in order. But in general the soul does no more than receive and follow the images which are presented to it. And though the objects appear very strong, they are in general strangely associated, and have no coherency. Sensations succeed one another, without the soul's combining or putting them in order. We have then sensations only, and not notions, for the latter can only occur when the soul compares the sensations, and operates upon the ideas which it has received

through the medium of the senses. Thus dreams are formed only in the inferior faculties of the soul. They are not produced by its own energy, and only belong to the animal memory.

It is singular that in dreams we never imagine that we hear, but only that we see; and it is still more extraordinary, that the images we see are perfectly like their originals. It seems as if none but the soul of a painter could draw such true and regular pictures; and yet this is performed in dreams by those who know nothing of that art. Beautiful landscapes, which we have never observed with attention, present themselves to us in dreams, as true and exact as if delineated by the best artist.

As to the accidental causes of dreams, by which former sensations are renewed, without the assistance of any actual and present impression, it may be observed, that in a sound sleep we never dream, because all the sensations are extinguished; all their organs are inaccessible; every thing sleeps, the internal as well as external senses. But the internal sense, which first goes to sleep, is also the first that awakes, because it is more lively and active, and is perhaps more easily moved, than the exterior senses. Sleep is then more imperfect, and consequently this is the time for dreams. Former sensations, particularly those on which we have not reflected, are renewed. The internal senses, which, by inactivity of the exterior senses, cannot be taken up with present impressions, are employed with, and operate upon, the preceding sensations. They

act most upon those which have most strongly affected us; and this is the reason why dreams are generally either frightful or singularly pleasing.

Another circumstance worth observation in regard to dreams is, that they mark the character of the dreamer. From the phantoms which fill his imagination in the night, we may judge whether he be virtuous or vicious. A cruel man continues to be so in his sleep, while the philanthropist preserves his mild and benevolent disposition. It is true, that an impure and wicked dream may be occasioned by the state of the body, or by external and accidental circumstances. But our conduct when we first awake will show, whether such dreams ought to be imputed to us. We need only attend to the judgement we then form of them. A good man is not indifferent about his dreams. If he have deviated from the rules of justice and virtue in his sleep, he is sorry for it when he awakes. It is certain that a mind which falls asleep with a sense of the grace of God, seldom fails of what may be called heavenly ideas in its dreams.

But sleep is not the only time in which our minds are disturbed with odd and fantastic images. How many persons are there who dream while awake! Some form high ideas of themselves, because wealth, or the favour of princes, has raised them to an elevated rank. Others make their happiness consist in the pride of fame, and feed on the chimerical hope of immortality. Intoxicated with passions and with vain hopes, they imagine that they are happy; but this false and

frail felicity vanishes like a morning dream. Persons of this character have been well described by the prophet: "They resemble a hungry man, who dreameth, and behold he eateth; but he awaketh, and his soul is empty: or as a thirsty man dreameth, and behold he drinketh; but he awaketh, and behold he is faint, and his soul hath appetite."

Let us never seek our happiness in vain phantoms and delusive dreams; but rather let us pray for that wisdom which will direct us to aspire after permanent felicity, and that glory whose radiance endureth for ever; and which will occasion no tears of remorse when, at the hour of dissolution, we take a retrospect of our past life.

NOVEMBER XIII.

All Things in the Universe are connected together, and combine for the Preservation of the whole.

EVERY thing which the beneficent Creator has produced upon our globe is admirably connected together, and contributes to the mutual preservation of the whole. The earth itself, with its rocks, minerals, and fossils, owe their origin and continuance to the elements. The trees, plants, herbs, grass, and all kinds of vegetative bodies, draw their subsistence from the earth, whilst the animals, in their turn, feed upon the vegetables. The earth gives nourishment to the plant, the plant is food for the insect, the insect for the bird,

the bird for wild beasts; and, in their turn, the wild beasts become the prey of the vulture, the vulture of the insect, the insect of the plant, and the plant of the earth. Even man, who turns all these things to his own use, becomes himself their prey. Such is the circle in which all sublunary things revolve.

Thus all things appear to have been created for each other, and no one solely for itself. Tigers, lynxes, bears, ermines, foxes, and other animals, provide us with furs for our covering; dogs pursue the stag and the hare, to furnish our tables; the terrier drives the rabbit from its deepest recesses into our snares; the horse, the elephant, and the camel, are trained to carry burdens, and the ox to draw the plough; the cow gives us milk, and the sheep its wool; the rein-deer makes the sledges fly over snow and ice; and the swine, the hedge-hog, and the mole, dig up the earth, that the seed of plants and herbs, being dispersed, may the more easily propagate. The hawk serves us for fowling, and the hen gives us eggs; the cock's shrill cries awake us in the morning, and the carols of the lark amuse us in the day. At the approach of evening we hear the blackbird whistle amidst the leafy shade, and the night is sacred to the melodious warbling of the nightingale

The superb plumage of the peacock delights our eyes; the silk-worm spins its precious web to clothe us; and the bees collect with care the honey we find so delicious. The sea continually throws upon its shores multitudes of cray-fish, lobsters, oysters, &c. while a variety of other fish, from

the depths of the ocean, swarm upon our coasts, and enter our rivers in shoals; thus furnishing an ample supply of nourishment for men, birds, and quadrupeds. The lantern-bearer, or great fly of Surinam, shines through the night to give light to the inhabitants of that country.

If we observe the different occupations of mankind, we shall find that they also tend to the same end which nature has proposed. The mariner tempts the dangers of the sea, and braves the storm, to bring to his native land merchandise that does not belong to it. The soldier sacrifices his life to his country, and the good of his fellow-citizens. The lawyer is only employed for others. Sovereigns and magistrates, who are at the head of government, devote their time and powers to the public. Parents hoard up wealth for their children. The ploughman sows and reaps grain, of which he consumes but little himself. Thus we do not live for ourselves alone; for the wise Author of nature has so ordained, that all beings should become useful to one another.

From these reflections let us learn our mutual duties. The strong should assist the weak; the intelligent man should assist with his advice those who want it; the learned should instruct the ignorant; in a word, we should love our neighbour as ourselves, and thus fulfil the designs of our Creator. The reciprocal offices which men owe to each other, have induced them to form societies. That which divided force could not accomplish, is easily performed by united strength.

No person could erect a fine building, or palace, were he alone obliged to lay the foundation, dig the cellars, make and burn the bricks, raise the walls, put on the roof, make the windows, decorate the apartments, &c.; but all this is done with ease when the different workmen assist each other. Such is the constant law of nature, that, in all the arts and sciences, nothing fine or excellent can be accomplished without the concurrence of several persons. How many thousands of men does it not require to make a monarch powerful, an empire happy, or a nation famous and flourishing! In all this we recognize the supreme wisdom of our Creator. In order that the inhabitants of our globe, and particularly that mankind might be happy, he formed such relations and connexions between all beings, that they could not subsist without each other. Experience daily teaches that he had our good in view. The whole world was planned for this purpose, and every part of it concurs towards the felicity of mankind. Even those things which appear to us of so little importance, that we scarcely deign to look at them, all contribute to render us happy. The very insects we so much despise are useful to us. Thousands of hands are daily employed in satisfying our wants, and thousands of animals are sacrificed for our support. And in how many other ways, of which we are ignorant, is nature active in our favour! Merciful and indulgent Father! teach us to appreciate thy goodness and our own happiness; and may we henceforth resolve to devote our limited strength

and faculties to thy service, and to the cause of righteousness amongst our fellow-creatures!

NOVEMBER XIV.

Common Salt.

THE seasoning most generally used, and that which the rich or poor, the king or the beggar, can least dispense with, is common salt. Its flavour is so pleasing, and it has such excellent properties for digestion, that it may be considered as one of the most valuable gifts which nature has bestowed upon man. It is given to us in different ways. Those who live near the sea receive it thence. They dig pits on the shore, which they call *salt-pits*, and plaster them with clay; at a full tide the sea flows into them; and the water which it leaves soon evaporates by the heat of the sun, and the salt is left at bottom in great abundance. In other places nature produces salt springs, fountains, and lakes, and to extract the salt from these, the water is boiled in great caldrons. In other places, salt is found in solid masses in the mountains. The most famous mines are those of Catalonia and Poland. These different kinds of salt are all alike as to their chief properties. Experience has taught us, that salt dissolves in the stomach and bowels; that it has a power of digesting, and prevents the putrefaction and too great fermentation of our food. For

this reason it is taken inwardly, to promote digestion, to rectify crudities, to excite the appetite, and to stimulate the stomach, the nerves of which it gently irritates, and promotes all its operations. Common salt, therefore, proves to be one of the best digestives in nature. Other salts act too powerfully, or are of so unpleasant a taste, that they cannot be mixed with our food; but common salt acts gently, assists the concoction of all eatables, and prevents that putrefaction to which they are naturally exposed.

Salt is a particular blessing which we do not set a proper value on, though we daily enjoy it. If we attended more to our daily blessings, how much gratitude towards God would they excite in us! The greater part of our food would be insipid and tasteless without salt; yet this is the least of its advantages, as we have observed the great use of it with respect to health. Another circumstance in regard to salt will appear interesting to every observer of the works of nature: the smallest grain of common salt seems cut into eight angles, and six sides, like a die; whence most masses of this sort of salt must be of a square or cubical form. In this again the Divine Hand is visible, which has given to salt an invariable form, that has been such from the beginning of the world. This form, constantly the same, and so exact, is a very striking proof that it does not owe its origin to a blind chance, but to the will of an Intelligent Being. This thought is too important, and too necessary to our peace to be disregarded: we should therefore embrace every op-

portunity of recollecting it, that it may be deeply and indelibly impressed upon our minds.

NOVEMBER XV.

Origin of Fountains.

ALL great rivers are formed by the union of smaller ones; these owe their rise to the rivulets which run into them, and the rivulets derive their origin from springs and fountains. Of this there can be no doubt. But whence do the springs proceed? Since water, by its gravity and fluidity, always occupies the lowest parts of the earth's surface, whence can the water come which constantly flows from the most elevated regions?

In the first place, it is certain that rain, snow, and, in general, all the vapours which fall from the air, furnish a great part of the water which flows from springs; consequently, rivers and springs are very rare in the deserts of Arabia, or in those parts of Africa where it never rains. These waters penetrate into the earth, till they are obstructed by beds of white clay, through which they cannot pass. Here they accumulate, and become fountains; or they collect in cavities, which afterwards overflow, and the water gradually gets out through innumerable crevices, great and small, still falling towards the bottom, to which its weight naturally inclines it. Thus the water continually flows, and makes itself sub-

terraneous currents, with which other currents join, and by their union form what is called a vein of water. It is, however, very probable, that, in some countries at least, fountains do not owe their origin entirely to the waters which fall from the atmosphere; for there are on several high mountains considerable springs and lakes, which do not seem as if they could have been produced entirely by snow or rain.—There are many springs which yield an equal quantity of water at all seasons, and sometimes furnish even more in times of great heat and drought, than in moist and rainy seasons. It is, therefore, certain, that there are other causes both for the origin and supply of fountains.

Many springs are produced by vapours, which are carried up into the atmosphere and driven by the wind towards the mountains, or, by the power of universal attraction, are drawn towards those great masses. The atmosphere is more or less loaded with aqueous vapours, which being driven and pressed against hard and cold rocks, condense immediately into drops, and thus increase the springs.

We must, however, allow that all springs cannot derive their origin from this cause. For must not the Danube, the Rhine, and other great rivers which come from high mountains, dry up when these enormous masses in winter are covered with snow and ice? Certainly there must be caverns, which, by a communication with the sea or lakes, contribute to form springs. The sea-water having gone through subterraneous chan-

nels into these great cavities, it rises in vapour through a number of crevices, and forms into drops, which, falling again with their own weight, sometimes take a very different course, because water cannot always penetrate where vapours do. Perhaps also the sea-water, particularly in countries near the main ocean, may filter through the ground, and produce springs; and these springs generally taste like the waters whence they flow. But those upon high mountains cannot proceed from the same cause, because the sea-water cannot rise so high; and if it could, it would not be so sweet or potable.

All the causes here pointed out contribute more or less to the formation of springs; and there may be other causes unknown to us. It is true, that nature is always simple in its operations; but this simplicity does not consist in making use of one cause only for each particular effect. It consists in making use of as few as possible, and does not exclude several auxiliary causes which concur in working the effect which nature proposes.

But though it were otherwise, and though the origin of fountains were more obscure than it really is, we must still acknowledge God as the creator and preserver of these salutary springs. "Jehovah speaks, and the fountains issue from the bosom of the hills; the springs become rivulets, and these swell into rivers, which widely diffuse the blessings of abundance and fertility. The inhabitants of the country allay their thirst in the translucent streams, and seek repose in the

umbrageous groves through which they gently flow."

It is God who causes these useful fountains to spring from the high places of the earth: sometimes they wind among the mountains; at other times they precipitate themselves in cataracts from lofty eminences, being augmented by atmospheric exhalations, or by the union of different streams. Thus our God preserves in the kingdom of nature that continual circulation of fountains, rivulets, and rivers, which conduces so essentially to the fertility of the earth, the salubrity of our dwellings, and the draining of waters, which might otherwise prove injurious by their too great abundance.

NOVEMBER XVI.

Hair of the Head.

If we consider the curious construction of the hair of our heads, we shall find it worthy our attention, and discover in it evident traces of the Divine power and wisdom.

In each entire hair we distinguish an oblong slender filament, with a knot or bulb at the root, which is generally thicker, and always more transparent than the rest. The thread is the body of the hair, and the knot is the root. The long and principal hairs of the head have their root, and even a part of the filament, enclosed in a little case, formed by a small membrane. The

size of this is in proportion to the size of the root, always large enough to leave a little space between the root and the case. The root has two parts, the exterior and the interior; the exterior is a pellicle composed of little flakes; the interior is a glutinous fluid, where some slender fibres meet: this is the marrow of the root. From the external part of the bulb proceed five, and sometimes (though very seldom) six, little white threads, extremely fine, transparent, and often twice as long as the root. Besides these threads, little knots are seen here and there; but they are viscous, and easily dissolved by heat. From the inside of the root grows the body of the hair, composed of three parts; the external sheath, the interior tube, and the marrow.

When the hair has arrived at the pore of the skin through which it is to pass, it is strongly enveloped by the pellicle of the root, which then forms a very small tube. The hair pushes out the cuticle before it, which serves as a sheath to guard it at first, while it is still soft and tender. The rest of the envelope, or coat of the whole hair, is of a particular substance; it is transparent, and more so towards the point. In a young hair the coat is soft; but it becomes afterwards so hard and elastic, that it shrinks back with some noise when it is cut. This external coat preserves the hair a long time. Immediately under it are several small fibres, which extend the whole length of the hair from the root to the point. They are joined to each other, and to the point, by several elastic threads. And this col-

lection of fibres forms a tube filled with two substances, one fluid, and the other solid; which together compose the marrow of the hair.

An attentive observer of God's works will acknowledge the Divine wisdom in the admirable construction of the hair, as well as in all other parts of the human body. There is nothing in the formation of man, from the crown of the head to the sole of the foot, that does not show the perfection of the Creator. Even those parts which seem of least importance and the most easy to be dispensed with, become of consequence when considered as connected with the other members of the body, or when their admirable construction and design are properly investigated. This we may particularly observe in respect to our hair. How many people are there who consider it as an object not worth attention, and do not discover in it any traces of the wisdom and goodness of God! But, besides that in general there is no part of our bodies useless or without design, it is very easy to discover the wise purposes for which hair was given to us.

In the first place, it is visible that hair contributes to the beauty and ornament of the face; but this is perhaps its smallest use. It evidently preserves the head from cold and damp, so as to keep the brain in its natural state of warmth. It also promotes a gentle and insensible evacuation of bodily humours by perspiration; and relieves the head and other nobler parts from the superfluous moisture which might otherwise collect there. The hair may answer many other purposes with

which we are, at present, unacquainted. But let us content ourselves with having been informed of some of the ends which God has proposed to himself; for these will afford us sufficient subjects to acknowledge and adore the power, wisdom, and goodness of our Creator.

NOVEMBER XVII.

System of the Universe.

HITHERTO we have been considering the earth, which is but a speck in comparison of the system of the universe. Let us now raise our thoughts to those innumerable worlds, at the sight of which, this spot that we and millions of other creatures inhabit, will appear as nothing. Let us examine, contemplate, and adore.

The sun, which gives life to every thing, is almost in the centre of the system; and, without changing place, turns round his own axis, from east to west, in about twenty-six days. All the planets, from Mercury to the Georgium Sidus, move round the sun in oblong or elliptic circles.

Mercury, which of all the globes is nearest to the sun, performs his revolution in 87 days, 23 hours, and 25 minutes; but by reason of his proximity to the sun, he is generally buried in his rays, and is consequently invisible to us.

Venus describes a larger ellipsis, and finishes her course in 224 days, 16 hours, and 49 minutes.

The earth completes her revolution in 365 days,

5 hours, and 49 minutes, forming what we commonly term a year; and the moon finishes hers in the same space of time.

Mars finishes his course in 686 days, 23 hours, and 30 minutes.

Jupiter and his four moons in about 4332 days and 8 hours; nearly twelve of our years.

Saturn and his seven satellites takes 10,761 days and 14 hours, a space of time nearly equal to thirty of our years, in describing his immense orbit.

Lastly, the Georgium Sidus, with his six moons, performs his revolution in 30,445 days, upwards of eighty of our years.

But are these the bounds of the universe? No, certainly. Far beyond the Georgium Sidus is the region of fixed stars, the nearest of which is at least 400,000 times further from the earth than the earth is from the sun, though his mean distance from us is not less than ninety-five millions of miles, or 23,799 semidiameters of the earth. How many globes also may there be in the great fpace between Saturn and the fixed stars, that are not visible to us!

But is it possible that the sun, which appears to traverse the sky in twelve hours, should remain fixed in the centre of the universe? Do we not in the morning see it in the east, and in the evening in the west? And can the earth move continually round the sun without our perceiving it?

This objection, founded on the illusion of our senses, is in reality of no weight. Do we perceive the motion of a boat in sailing upon the river? and when we are in a boat or carriage,

does it not seem as if every thing round us moved, and as if all the objects went back out of their places, though in reality they never move? However our senses may be deceived in this respect, our reason compels us to acknowledge the truth and wisdom of the theory which asserts the motion of the earth. Nature always acts in the shortest, easiest, and simplest ways. By the single revolution of the earth round the sun, we can account for the different appearances of the planets, their periodical changes, their situations and their direct and retrograde motions. And is it not much more natural and easy, that the earth should turn round its axis in twenty-four hours, than that such great bodies as the sun and planets should move round the earth in that space of time? One undeniable proof of the sun, and not the earth, being in the centre of the universe is, that the motions and distances of the planets depend upon the sun, and not upon the earth. If it were otherwise, where would be the harmony and perfect conformity which is now so evident in all the works of the Creator? According to our hypothesis, each planet has the same motion we attribute to the earth.

These reflections on the system of the universe are calculated to give us the highest idea of our adorable Creator, and to make us sensible of our own insignificance. With what pleasure does the mind pass from one idea to another, till it is lost in the contemplation of these great objects! With what profound veneration and admiration does it feel the greatness of its God! It is true, that the

limits of the human understanding will not permit us to have an exact and perfect knowledge of the solar system; but we know enough to be convinced that the whole is planned with infinite wisdom and goodness, and that no system could be formed more beautiful, more worthy of the Supreme Being, or more beneficial to the inhabitants of the different globes.

NOVEMBER XVIII.

Lobsters.

If lobsters were of no value to us as food, they would still be worthy our attention. The females a little before this time of the year, undergo a great change. They cast of their old shells, and acquire new ones. This is termed their moulting. In thus changing their coverings they increase in size, and this mode of growth is common to all crustaceous animals: they augment in bulk every time they throw off their old shells, and this operation is very painful. At the same time that they change their shell, they renew their stomach and intestines. The animal, while it is moulting, seems to feed upon its former stomach, which wastes by degrees, and is replaced by a new one. The little round white stones, improperly called crabs' eyes, begin to form when the stomach is consuming, and are afterwards enclosed in the new one, where they gradually diminish, till at last they entirely dis-

appear. It is probable that the animal uses them as a remedy for the disorders of its stomach; or perhaps this matter has a petrifying quality proper for forming a new shell.

Except at the time of casting their shells, the lobsters keep at the bottom of the water near the shore. In winter they prefer deep water; but in summer they draw near the shore, if the want of food does not oblige them to plunge deeper into the sea. That they may catch their prey more easily, nature has given them several claws and legs. Sometimes they have claws as large as their head and body together, and, what is still more singular, they have the faculty of producing new claws and horns when they have been broken off. They can even get rid of them when they become inconvenient. They can perform this operation in any posture; but they do it more easily when they lie on their backs. If with strong iron pincers the shell be broken, and the flesh bruised, at the third or fourth joint of the claw, as soon as the wound is made, the lobster in its pain shakes it about till it falls from the body. When the claw is broken, a gelatinous substance oozes out, and staunches the blood; but if this were taken away the animal would bleed to death. This substance envelopes what we may call the bud of the new limb; which at first appears only as an excrescence, or a little cone. By degrees this cone lengthens into the form of a claw, and becomes as perfect as the old one.

The manner in which these animals are propa-

gated is very singular. The prolific substance is found in the male in a very long thread; and the sex is distinguished by a double hook under the tail, which is not observable in the female. These animals become pregnant about autumn, and if a female be opened at that time, several red clots may be perceived, which are the evidences of impregnation. These gradually disappear, and a number of little round eggs like hemp-seed are found under the tail, fastened together by small fibres. The first eggs appear in December, and soon increase to hundreds. They enlarge by degrees, as the weather grows warm; and before midsummer there are little live lobsters found amongst the eggs, the size of an ant, which adhere to the fibres under the tail, where they remain brooding till all the eggs are hatched. They afterwards detach themselves from their mother, and cling to the fibres and roots of trees which they find in the water near the shore, where they remain till they are strong enough to venture into the sea.

The lobster is certainly one of the most extraordinary creatures in the world; an animal whose skin is a shell, which it casts off every year, to clothe itself with new armour; an animal whose flesh is in its tail and legs, and whose hair is in the inside of its breast; whose stomach is in its head, and is annually renewed, whilst the first function of the new stomach is to digest the old one; an animal that carries its eggs within its body till they are impregnated, and afterwards carries them externally under its tail; an animal

with two stones in its stomach, which are engendered and grow there, and with which it feeds itself till they are consumed; an animal which can throw off its legs when they become troublesome, and replace them with others; and whose eyes are placed in long moveable horns.—So singular a creature will perhaps ever remain a mystery to the human mind. It affords new subject, however, to acknowledge and adore the power and wisdom of the Creator.

NOVEMBER XIX.

Advantageous Situation of all the Parts of the Human Body.

If we examine the human body with attention, we cannot but observe that all the parts of which it is composed are placed in the manner best adapted for their several uses. The wisdom of the Creator has allotted to each member its proper place; and, in the formation of our bodies, he has not only attended to our wants and conveniences, but even to ornament and beauty.

With respect to our wants, it is evident that all the parts are placed in the most advantageous manner. Our body is a machine designed to move of itself by the powers given to it, without requiring any impulse from exterior force. It was necessary that our limbs should perform with ease and promptness the will of our minds. All

the bones are joined together ;—but, in order that we should use our limbs without difficulty, stretch or draw in an arm, stoop or rise as we please, the bones are divided into joints, and each bone is rounded at the end, and set within the spherical cavity of another bone, where it moves with ease, because it is covered with a smooth polished cartilage, and moistened with an oily humour, which prevents any injury from friction. It is peculiarly remarkable, that these bones are so firmly fixed in their sockets that they do not slip or move from each other, though the feet bear so great a burden, and the hands are sometimes obliged to lift a weight of more than a hundred pounds.—In placing the parts of the body, God has also attended to our convenience. The determination and will of the soul may be executed by the organs of the body without any difficulty or obstacle. By means of the senses, it is immediately informed of whatever interests it, and the several members of the body directly obey its orders. The eye, as it is designed to watch over the whole person, occupies the highest place. It can turn freely on all sides, and observe every thing that passes. The ears also are placed in a distinguished part, at the two sides of the head ; and are open night and day, to convey to the soul every impression of sound, and to make it attentive to the least noise. As our food passes through the mouth into the stomach, the organ of smell is placed immediately above the mouth, to guard it, as the eye also does, from receiving any thing corrupted or improper. As to the

sense of feeling, it has not its seat in any particular place, but is diffused over all parts of the body, in order to make us sensible of pleasure and of pain; of those things that are injurious, and of those that are salutary. The arms are the ministers the soul employs to execute most of its desires, and are therefore placed near the chest, where the body is the strongest; and, without being too far from the lower parts, are most conveniently situated for every sort of exercise and labour, as well as for the defence of the head and other members.

Lastly, the Creator in the formation of the human body, has deigned also to attend to its beauty. This consists in the visible harmony, the exact proportion of the limbs, and the pleasing mixture of colours in a fine and delicate skin. We may observe, that those parts of the body which are double, as our eyes, ears, arms, and legs are placed on each side the body, at an equal height, answering to right and left; whereas those that are single, as the forehead, nose, mouth, and chin, are placed in the middle. This proportion appears in the great as well as in the small. The length of the sole of the foot makes the sixth part of the height of the whole body, as the face makes the tenth. In children the head is larger than it ought to be in proportion to the rest: because the head being the chief part of the body, and the seat of the senses, it ought to come the sooner to perfection; and the more so, as being composed principally of bone, it could not extend so much as the fleshy mem-

bers, which it must otherwise have done; for we observe, that in infancy all the limbs grow at the same time, and spread with the most exact proportion, in length, breadth, and thickness, according to the size of the whole body.

Admire, O man! the perfection and beauty of thy body; the admirable connexion, harmony, and proportion of all its parts. Observe how all thy members are connected, without their ever being embarrassed, or impeding each other in their different functions; but they are placed in the manner best adapted for their use, and so as to assist one another mutually. The organs are so many springs in this admirable machine. They correspond with each other, and act in concert to fulfil the several purposes for which they were designed. Be careful not to destroy this machine so curiously contrived, nor to deform it by excesses and irregularities. Beware of degrading it by shameful passions. On the contrary, let thy body ever remain a monument of the wisdom and goodness of God. But, above all, never neglect thy soul, which has been degraded by sin, but endeavour that it may be restored to its original purity by the mediation of thy Redeemer. It is by this alone that thou canst be compensated for the change thy body will undergo, when it shall return to the dust of which it was formed.

NOVEMBER XX.

Order and Regularity of Nature.

In contemplating the world we every where discover traces of a Supreme Intelligence directing the whole, which foresaw all the effects that were to result from the powers it impressed upon nature, and which numbered, weighed, and measured all things with infinite wisdom.

Thus the universe, once formed, may always continue and constantly fulfil its designs, without the necessity of changing any of the laws originally established. This is not often the case in respect to the works of man. The best-contrived machines soon fail to answer the intended purposes. They require to be frequently repaired; and are soon spoiled and out of order. The cause of these faults is in the original construction; for there is no artist, however skilful, who can foresee all the changes to which his work is liable; much less is he able to obviate them.

The corporeal world is also a machine; but the parts of which it is composed, and their several uses, are numberless. It is divided into many luminous and opaque globes, which serve as habitations for an infinite multitude of living creatures. The opaque globes revolve round the luminous ones, in their prescribed orbits and limited times, in order to receive from them light and heat, day and night, seasons and various

climates, food and growth, according to the nature and wants of the different inhabitants. The situation of the planets and their mutual gravitation are so diversified, that it seems almost impossible to determine beforehand the time of their returning to the point whence they set out, to begin again their periodical course; and yet notwithstanding the variety of phenomena which these globes present, and the astonishing number of their movements in the course of thousands of years, these enormous masses have never struck against, nor interrupted each other in their revolutions. All the planets regularly run their course in the time prescribed them; and constantly preserve their direction and respective distances from the sun. The fixed stars are the same now as they were a thousand years ago. The distances, projectile forces, right ascensions, declinations, parallaxes, and directions of all the celestial bodies are perpetually the same. The sun also is still at the same height; the days and nights, years and seasons, are all what they were formerly; and all afford incontestable proofs that in the first arrangement of the heavenly bodies, and the regulation of their course, the Author of nature foresaw and determined the future state of the world, and of all its parts, to the end of time.

The same may be said of our earth, which is annually subject to many revolutions and changes of climate. For, though it seems at first as if fine weather, cold, heat, dew, rain, snow, hail, lightning, storms, and winds, were dispensed by chance;

as if it were by mere accident that the waters overflow the earth, changing lands into lakes, and in other places seas appearing where there were continents, mountains forming while others are mouldering away, rivers drying up or changing their course; yet it is certain that each modification of our earth has its sufficient cause in the preceding modification; this in that which preceded it; and the same from the beginning of all things. But nothing is more calculated to make us sensible of our ignorance in respect to the particular causes of natural events, and their connexion with the future, than this variety which we observe in the temperature of the air; a variety which has such an effect on the appearance and the fertility of our globe. In vain we repeat our meteorological observations: we cannot deduce from them any certain rules and consequences for the future, and we shall never find one year perfectly like another. Yet we are well convinced that these continual variations, this apparent disorder in the elements, do not destroy our globe, do not alter its form, or make it an uninhabitable chaos; but are, on the contrary, the true means of preserving from year to year its order, fertility, and abundance. Since, therefore, each present modification is founded upon the former, it is evident that the elements were not formed and combined by a blind chance; but that, from the beginning, Boundless Wisdom produced, combined, and mixed the elements, measured their force, and determined their effects, to the end of time.

Thus the world is not composed of unconnected materials, which have no relation to one another. It is one regular and perfect whole, the construction and plan of which is the work of a Supreme Intelligence. If we behold in the world a multitude of beings of the same nature and design with ourselves, and connected with us in many respects; if we discover a still greater number of species of other creatures, which are also more or less mutually connected; if we acknowledge, that by the mixture and action of the elements, all these animated beings are preserved, and receive all that their nature requires; if afterwards we look beyond this, and raise our thoughts higher; if we consider the connexion between our earth and the celestial bodies; the constant regularity of all their motions, the conformity, the wonderful harmony between all the globes within our sight; we shall be more and more struck with admiration of the magnificence, order, and beauty of nature, and more clearly convinced of the infinite wisdom of the Creator. But all that we yet know of the order and harmony of the corporeal world, is but a slight ray of that great light of eternity, by which the Divine Wisdom, now in many things impenetrable to us, will be made manifest hereafter.

NOVEMBER XXI.

Winter in the Northern Countries.

THE time is now rapidly approaching which excites the complaints of so many discontented people. The severe season of winter appears to them inconsistent with the plan of the Ruler of the universe, which in all other respects is so wise and beneficent. The rich complain that nature has become dull and melancholy; and the poor, whose poverty and wants increase at this season, murmur and lament. Yet let them magnify as they please the inconveniences and distresses of winter, they will at last be compelled to acknowledge the goodness of God towards them, even in this respect, if they compare their lot with that of other nations.

In many of the northern countries there is neither spring nor autumn, and the heat is as intolerable in summer as the cold is in winter. The severity of the latter is such that even spirits of wine freeze in the thermometer. When the door of a warm room is opened, the external air which enters turns all the vapours into snow; and they appear like thick white clouds. If persons go out of the house, they are almost suffocated, and the air seems to pierce their lungs. Every thing appears dead, as nobody dares venture abroad. Sometimes the cold suddenly becomes so intense that unless a person escape with

celerity, he is in danger of losing an arm, a leg, or even his life. The fall of snow is still more dangerous; the wind driving it with such violence that roads are blocked up, trees and bushes are covered, and every step plunges the traveller into some new precipice. In summer, for three months successively, there is constant day, and in winter, for the same space, there is a continued night.

What would those persons say who complain of the cold in this country, were they obliged to live in such a climate as we have just described? It is certain we do not know our own advantages, or a very little reflection would suffice to render us contented with our lot. The days of winter, however severe we may think them, are nevertheless supportable; and if some people suffer much from them, it is generally because they have reduced themselves to a state of effeminacy by improper living.

But why has the Creator ordained that thousands of people should live in countries where nature fills them with terror for a great part of the year? Why has he not made all his people as happy as we are? Senseless inquiries! We are mistaken if we suppose that the inhabitants of the pole are unhappy from the severity and length of their winter. Poor, yet exempt through simplicity from all desires difficult to be gratified, those people live content in the midst of the icy rocks that surround them, without knowing the blessings which the southern nations consider as an essential part of their happiness. If the bar-

renness of their soil prevent them from having such variety of productions of the earth as we have, the sea is so much the more bountiful in her gifts. Their mode of living inures them to cold, and enables them to defy storms. As to particular resources, nature provides them with abundance. Their deserts are full of wild beasts, whose fur protects them from cold. The reindeer supplies them with food, drink, beds, clothes, and tents.—These are most of their wants, and give them little trouble to obtain. When the sun does not rise with them, and they are surrounded with darkness, nature herself lights a torch for them. The aurora borealis brightens their night. Perhaps those people consider their country as the greatest and happiest upon earth, and may regard us with as much pity as we can possibly feel for them.

Thus we find that every climate has advantages and inconveniences, generally so well balanced that it is difficult to say which merits a preference. Considering things in this point of view, no country upon the earth can be said to be more advantageous than another, whether the sun dart his rays upon it perpendicularly or obliquely, or whether it is perpetually covered with snow. In one place the conveniences of life are more abundant. In another the variety of blessings is not so great; but those who have not such comforts, escape many temptations, corroding cares, and bitter remorse; in a word, they are ignorant of many obstacles to happiness, which compensates them for the pleasures of which

they are deprived. We know with certainty, that Providence has dispensed to every part of the world, whatever is necessary for the support and happiness of its inhabitants. All circumstances are adapted to the nature of the climate; and God provides by the wisest means for the wants of all his creatures.

NOVEMBER XXII.

Transformations in Nature.

The transformations that take place in nature are very numerous; or rather, it may be said that every thing in the natural world is metamorphosed. The form of objects continually varies. Certain bodies pass successively through the three kingdoms of nature; and there are compositions which gradually become minerals, plants, insects, reptiles, fish, birds, beasts, and men. Every year millions of bodies mix together and are reduced to dust. Where are the flowers which adorned our gardens, fields, and meadows during the spring and summer? One species appears, then fades, and makes room for another. The flowers of March, with the modest violet, after having proclaimed the coming of spring, disappear, and give place to the tulip and the rose. To these others have succeeded, till all the flowers, in their turn, have fulfilled their design. It is the same in respect to mankind. One generation

rises, and another disappears. Every year millions of human bodies return to the dust whence they came, but out of these reduced bodies new ones are formed. The salts and oils of which they were composed, dissolve in the earth; the more subtle parts are attracted by the heat of the sun, and rise into the atmosphere, where they mix with other substances, are scattered here and there by the wind, and fall again in rain and dew; whilst the grosser particles mix with the earth. The grass which is nourished by them shoots up into long stalks; and it is thus that the flesh of man, transformed into grass, serves to feed the flocks, whose salutary milk is afterwards converted to our own subsistence.

These continual transformations in nature are certain proofs that the Creator ordained that nothing should perish or be useless. The dust on flowers which is employed in the fecundation of plants, is but a very small part of what each flower contains; but this superfluity is not lost: Divine Wisdom created bees, who make use of it for their honey. The earth bestows daily gifts upon us, and would at last be exhausted, if what it yields were not to be returned again. All organized bodies dissolve, and turn at last to earth. During this dissolution, their volatile parts rise into the atmosphere, and are dispersed about. Thus, the remains of animals are scattered in the air, the earth, and water; and perhaps the parts which fly into the atmosphere are much the least numerous. All these particles, dispersed here and there, unite soon again in new organized bodies,

which, in their turn, undergo the same change. These constant transformations, this circulation, which began with the world, will only end with it. But the most remarkable, or at least the most interesting to us, is that which relates to ourselves. We know that our bodies were not originally, nor will they hereafter be, composed of the same number of particles as at present. Our bodies, when in our mother's womb, were extremely small; at our birth they were larger; and since that time they have increased to fifteen or twenty times the size; consequently blood, flesh, and other foreign substances, drawn from the animal or vegetable creation, which did not originally belong to our bodies, have since been united with, and are become parts of ourselves. The need we have of daily food, shows a continual waste of the parts, and that this loss must be repaired by aliments. Many particles evaporate insensibly; for it appears, from certain experiments made by an eminent physician upon himself, that out of eight pounds of food, which a man in health may take every day, there is but a fiftieth part of it which turns to his own substance: all the rest goes off by perspiration, or other excretions. From this, it may be inferred that ten years hence, there will not remain many of the particles of which we are now composed. And finally, when our bodies shall have gone through several changes, they will be transformed into dust till the day of resurrection, when that last and happy revolution will fix them immutably and for ever. Let us rejoice in the anticipation

of this future state, where we shall be free from all the changes of this life. Let us behold, with serenity, the daily revolutions to which all earthly things are subject, and which are necessary in our present state. It is by this means that we shall draw nearer to perfection.

NOVEMBER XXIII.

Greatness of God discernible in the smallest Things.

WHOEVER loves to contemplate the works of God, will trace him not only in those immense globes which compose the system of the universe, but also in the little worlds of insects, plants, and metals. He will acknowledge and adore Divine Wisdom as much in the spider's web, as in the power of gravitation which attracts the earth towards the sun. These researches are now the easier, as the use of microscopes discovers to us new scenes, and new worlds, in which we behold, in miniature, all that can excite our admiration. Those who have not opportunities to make use of these instruments, may read at least with pleasure some remarks on microscopic objects.

Let us, in the first place, observe the inanimate world. Behold those mosses, and the grass which God has produced in such abundance! Of how many fine threads and little particles are

those plants composed! What variety in their forms and shapes! Who can enumerate all their genera and species? Think on the innumerable multitude of small particles of which any particular body is composed, and which may be separated from it. If an hexagonal body of an inch square contain a hundred millions of visible parts, who can calculate the parts of which a mountain must be composed? If millions of particles of water may be suspended from the point of a needle, how many must there be in a fountain, a well, a river, or a sea! If from a lighted candle there issue in a minute more particles of light than there are grains of sand on the whole earth, how many fiery particles must pass from a great fire in the space of an hour! If a grain of sand contain several millions of particles of air, how many must there be in the human body! If we can divide a single grain of copper into millions of parts, without arriving at the first elements of matter; if odoriferous bodies can exhale fragrant particles enough to perfume the air at a great distance, without the body itself losing any thing of its weight, it would require an eternity for the human mind to calculate the prodigious number of these particles.

If we pass next to the animal creation, the scene will in a manner extend to infinity. During summer the air swarms with living creatures. Each drop of water is a little world teeming with inhabitants. Each leaf of a tree is a colony of insects, and perhaps every grain of sand contains a multitude of animated beings. Each plant,

grain, and flower, nourishes millions of creatures. Every person must have seen the innumerable swarms of flies, gnats, and other insects, which collect together in a very small space; what prodigious shoals must there be in proportion over the whole earth, and in the immense expanse of the atmosphere! How many millions of smaller insects and worms are there crawling on the ground, or underneath it, the number of which is known only to God! Does not the power of the Creator strike us with astonishment, when we reflect on the multitude of parts of which these little creatures are composed, whose existence is scarcely known? If we could not at any time prove it by experiment, should we imagine that there were animals a million of times less than a grain of sand, with organs of nutrition, motion, &c. There are shell-fish so minute, that even through a microscope they scarcely appear as large as a grain of barley; and yet they are living animals, with secure habitations, the different folds and cavities of which form so many different apartments. How extremely small is a mite! and yet this almost imperceptible atom, when seen through a microscope, is a hairy animal, perfect in all its limbs, of a regular form, full of life and sensibility, and provided with all the necessary organs. Although this animal is scarcely visible to us, it has many parts still smaller. And it is particularly admirable that the glasses which discover so many defects in the best finished works of man, show us nothing in these microscopic objects but regularity and

perfection. How inconceivably slender are the threads of the spider! It has been calculated that 36,000 of them would only make the thickness of common sewing silk. Each of the six papillæ, whence the spider draws the viscous liquor with which it makes the web, is composed of a thousand insensible pores through which so many threads pass, so that each of the spider's visible threads is composed of six thousand smaller ones! This must naturally strike the mind with astonishment. But, suppose we had microscopes which could magnify some millions of times more than those do through which the mite appears as large as a grain of barley, what wonders might we not then discover! Yet even then we should not be able to see to the end. It would be presumptuous and extravagant to suppose it. Each creature has a kind of infinity, and the more we contemplate the works of God, the more will the miracles of his power multiply in our sight. Our imagination is lost in the two extremes of nature, the great and the small; and we know not in which to admire the Divine Power most, whether in those immense globes which roll over our heads, or in those microscopic objects which are almost imperceptible to the sight. Let the contemplation of God's works be, therefore, our most pleasing occupation. The trouble we may take in studying them will be well rewarded by the pure and innocent pleasures they afford. It will awaken in us an ardent desire to arrive at those happy regions, where we shall not want microscopes or telescopes to discover the wonders

of God's works, which will be then distinctly visible, so as to unfold the design, construction, and connexion of each object; where endless hymns will be chanted to the praise of the Creator of the universe; and where all distinction of great and small will be at an end, as all will be great to us, and all will inspire our breasts with joy and admiration.

NOVEMBER XXIV.

Gradual Increase of the Cold.

We now feel that it grows gradually colder every day. In the last month we lost part of the warmth of autumn; but the cold was then very moderate, as the earth was still warmed by the rays of the sun. The present month is already much colder; and in proportion as the days shorten, the earth will continue to lose its heat. This we experience daily; but do we reflect as we ought upon the wisdom and goodness of the Creator, which are manifest in this arrangement?

In the first place, this gradual increase of cold is indispensably necessary to prevent the disorders, and perhaps the total destruction, of the human body. If the cold we experience in the depth of winter were to come suddenly at the beginning of autumn, we should be instantly benumbed, and the change would most probably prove fatal. How easily do we catch cold in the cool summer-

evenings; and how much worse would it be if we were to pass suddenly from the burning heats of summer to the chilling cold of winter! With what goodness, therefore, has the Creator guarded our health and our lives, in granting us such a temperature of air during the months immediately succeeding summer, as to prepare us by degrees to bear the increase of cold without injury.

What would become of those animals whose constitutions cannot bear severe cold, if winter were to come upon them suddenly? The greater part of birds and insects would be destroyed, together with their eggs and young, in a single night; but as the cold is augmented gradually, they have time to take the necessary measures for their preservation. The autumnal months warn them to quit their abodes, and repair to warmer climates, or to seek out places where they may pass the approaching winter in peace and safety.

It would be equally fatal to our fields and gardens, were the earth to be suddenly deprived of the summer's heat. All plants, particularly exotics, would inevitably perish; and the spring would produce no flowers, nor the summer afford us fruit. We should not, therefore, consider it of little consequence that, from the end of summer to the beginning of winter, the heat should gradually give place to cold. These insensible changes were necessary for our preservation, and that of the produce of the earth. Presumptuous man! though so often daring to murmur at the laws of nature, would soon find, to his cost,

were he able to derange one single wheel in the great machine of the world, that he would do much mischief, but could make nothing better. Nothing in nature operates suddenly. All natural events succeed each other by degrees, in the most regular manner, and precisely at the appointed time. Order is the great law which God proposed in the government of the world; and thence it is, that all his works are so beautiful, so invariable, and so perfect.

Let it henceforth be our constant employment to study this beauty, this perfection, in the works of God, and at every season of the year to trace the Divine wisdom and goodness. We shall then cease those senseless murmurs with which we so frequently offend the Creator. We shall find order, wisdom, and goodness in the very things we fancy imperfect; and we shall confess, from the strongest conviction, "that all the paths of the Lord are mercy and truth, unto such as keep his covenant and his testimonies."

NOVEMBER XXV.

Reflections on Snow.

DURING winter, the dullest season of the year, the ground is often covered with snow. Every body sees it fall, but very few take the trouble to examine its nature, or inquire into its use. Such is the fate of most objects which we have daily

before us, though we derive many advantages from them. And we too seldom appreciate those things which are, in reality, most deserving of our attention. Let us be wiser in future, and devote a few moments to the consideration of snow.

It is formed of very light vapours, which congeal in the atmosphere, and fall again in flakes more or less thick. In our climates these flakes are pretty large, but travellers assert, that in Lapland they are sometimes so small as to resemble a fine dry powder. This certainly proceeds from the great cold of that country; and it may be observed, that the flakes are larger with us in proportion as the cold is more moderate, and smaller when it freezes hard. The little flakes of snow are generally like hexagonal stars; but there are some of eight angles, others of ten, and some of an irregular shape. The best way of examining them is to receive the snow on white paper. But there has not hitherto been any satisfactory cause assigned for their variety of forms. The whiteness of snow may be more easily explained. It is extremely thin and light, and consequently has a great many parts, which are full of air. It is also composed of parts more or less close and compact; and such a substance does not admit nor absorb the rays of the sun, on the contrary, it reflects them very strongly, which makes it appear white to us.

Snow recently fallen is twenty-four times lighter than water: for if twenty-four measures of snow be melted, they will produce but one of water.

Snow evaporates considerably, which the most intense cold cannot prevent. It has been doubted whether snow ever falls at sea; but those who have gone voyages in the winter on the northern seas, assure us they have had a great deal of snow there. It is known that high mountains are never entirely free from snow; for if a part of it melt away, it is speedily replaced by new flakes. The air being much warmer in the plains than on high mountains, it may rain on the former while it snows heavily on the latter.

Snow has a variety of uses. As the cold of winter is much more hurtful to vegetables than to animals, the plants would perish if they were not preserved by some covering. God ordained, therefore, that the rain, which in summer cools and revives the plants, should in winter fall in the form of a soft wool, to cover the vegetables, and to guard them from the inclemency of frost and winds. The snow has a degree of warmth in it; but not too much, so as to choak the grain. When it melts, it becomes a fruitful moisture to the earth, and at the same time washes away every thing hurtful from the winter seeds and plants. What remains of the snow-water helps to fill up the springs and rivers which had diminished during the winter.

These reflections may convince us, that winter has its advantages, and that it is not so melancholy a season as many imagine. Let us, therefore, look up with joy and gratitude towards that Beneficent God who causes blessings to descend, even from the clouds of snow, upon the earth. How un-

pardonable to murmur, when it is our own fault if we do not every where discover traces of the Divine Wisdom and Goodness!

NOVEMBER XXVI.

Sleep of Animals during Winter.

NATURE, deprived of a variety of creatures which, in summer, rendered her lively and interesting, now appears gloomy and dead. Most of the animals which have disappeared are buried in a profound sleep for the winter. This is the case not only with snails, but ants, flies, spiders, caterpillars, frogs, lizards, and serpents. It is a mistake to suppose that the ants lay up provisions for the winter. The least cold benumbs them, and they remain in a state of torpidity till the return of spring. Of what use then would their stores be, since nature has prevented their requiring food in winter? What they collect in summer with so much care, is not for their subsistence: they make use of it in the construction of their habitations.

There are also many birds, which, when food begins to fail, hide themselves under ground, or in caves, where they sleep during the winter. It is at least asserted, that, before winter, the strand swallows hide under ground, the wall swallows in the hollows of trees, or old buildings, and the common swallows seek the bottom of ponds, and

fasten themselves in pairs to some reeds, where they remain motionless till they are revived by the return of fine weather.

There are also some beasts which bury themselves in the ground at the end of summer. The most remarkable of these is the marmot, or mountain-rat, which generally makes its abode in the Alps. Though it delights in the highest mountains, in the region of ice and snow, it is sooner benumbed with cold than any other animal; for which reason, it retires about the end of September or the beginning of October, into its subterraneous lodging, to remain there till the month of April. These animals display much art and contrivance in the plan of their winter residence. It is a sort of gallery, the two branches of which have each their particular opening, and both terminate in a recess, where the marmots live. One of these wings slopes down underneath their dwelling place; and it is in this lower part of their house that they deposit their excrements, which the moisture carries away. The other wing is the highest, and is their place of entrance. Their dwelling place is lined with moss and hay. They make no provision for winter, as it would be useless to them. Before they enter their winter quarters, each of them prepares a bed of moss and hay; and then, having well closed the entrance into their houses, they compose themselves to sleep. As long as this state of insensibility lasts, they live without eating. At the commencement of winter they are so fat, that some of them weigh twenty pounds; but by degrees they fall away,

and are very lean in the spring. When these animals are discovered in their retreats, they are found rolled up, and sunk into the hay. Their nose is laid on their belly, that they may not inhale a damp air. During their torpid state, they may be carried away without being wakened, and they may even be killed without appearing to feel the blow. There is another sort of rats, whose sleep is as long, and as sound, as these, and therefore called the sleepers.

Bears eat prodigiously at the beginning of winter, as if they intended to devour as much at once as would suffice for their whole lives. As they are naturally fat, and excessively so at the end of autumn, this abundance of fat enables them to bear their abstinence during the winter. Badgers prepare for their retreat into their burrows, in the same manner.

The instinct of these, and of many other animals, teaches them thus to dispense with food for a considerable time. From their first winter, even before they can have learnt any thing from experience, they foresee and prepare for their long sleep. In their peaceable retreats, they neither feel want, hunger, nor cold; and they know no season but summer. It is remarkable, that all animals do not sleep thus in winter. It is only those who, with the severe cold, can also support an abstinence of several months. If winter were to come upon them unawares, and they continued to live, though enfeebled with hunger and benumbed with cold, the only thing we could wonder at would be the strength of their constitution.

But as they know how to prepare in time for their sleep, with much care and precaution, it must be imputed to a wonderful instinct bestowed upon them by the Creator. The wisdom and goodness of God have supplied all the wants of his creatures, and this by a thousand means which no human imagination could think of.

NOVEMBER XXVII.

Use of Storms.

PERHAPS there are many who, in this stormy season, reckon winds and tempests amongst the evils of nature; not considering the advantages that result from them, nor being aware that without them we should be comparatively miserable. Storms are the proper means of purifying the atmosphere. To be convinced of this, we need only attend to the general temperature of the season. What thick and unwholesome fogs! what rainy, dark, and cloudy days are we subject to! Storms are chiefly designed to disperse these hurtful vapours, and remove them from us; and in this sense they are extremely beneficial. The universe is governed by the same laws as man, who may be called a little world. Our health depends, in a great measure, on the agitation and mixing of various humours, which would otherwise corrupt. It is the same with the world. That the air may not become noxious, it is ne-

cessary it should be in perpetual motion, and this is effected by the winds. I do not mean by gentle mild winds, but by storms and tempests, which collect the vapours from different countries; and, by forming them into one mass, mix together the good and bad, and thus correct the one by the other. Even storms at sea are useful. If the ocean were not often violently agitated, the very calmness of salt-water would occasion a degree of putrefaction, which would not only destroy the innumerable shoals of fish which live in it, but might also be very hurtful to mariners. Motion is the soul of universal nature. It preserves all things in order, and saves them from destruction. Why should the sea be excepted from the general rule; the sea which is the common receptacle for all the dregs of the earth, and wherein so many animal and vegetable substances putrefy? If it were not in perpetual motion, the water would stagnate, and infect us with an insupportable stench. Motion is as necessary to the sea, as circulation is to the blood of animals; and the other causes which give it a gentle, uniform, and almost insensible motion, are not sufficient to purify the whole mass. Nothing but storms could answer this purpose; and we see what advantages result from them to mankind, and to all animated creatures.

These are some of the uses of storms, and the reasons which ought to prevent us from considering them as destructive plagues, and instruments of Divine vengeance. It is true, that storms have often sunk ships richly laden, destroyed the hopes

of the farmer and gardener, laid waste whole provinces, and spread terror, desolation, and horror all around; but what is there in nature which has not its inconveniences? Shall we reckon the sun amongst the scourges of this world, because its situation makes the earth barren for some months, and because at other times its heat scorches and dries up our fields? Those phenomena of nature should only appear formidable to us, where the advantages are little or nothing in comparison of their attendant evils. But can this be said of storms, if we consider the uses which result from them? Let us therefore acknowledge that God has planned all with wisdom, and that we ought to be content with the present state of things. Happy those who are convinced that every thing in the universe tends to the good of the creatures in it; that whatever evils there may be in the world, they are compensated by numberless advantages; and that the very means which Providence uses to chastise us, are in themselves indispensable blessings, the general effect of which makes ample amends for the particular evils which may in some cases result from them!

NOVEMBER XXVIII.

Fortuitous Events.

PROPERLY speaking, nothing can happen by chance, for every thing has its real and determi-

nate cause. But what we call chance is no more than the unexpected concurrence of several causes which produce an unforeseen effect. Experience shows that this often happens in life. Unforeseen accidents may entirely change the fortunes of men, and overthrow all their designs. It seems as if naturally the race should be to the swift, the battle to the strong, and success to the wise; yet it does not always happen so: for an unexpected event, a favourable circumstance, or an accident impossible to foresee, often does more than all human power, knowledge, or prudence, could effect. How much to be pitied, therefore, would mankind be, if a wise and beneficent Being did not regulate events for them! How could God govern mankind, if what we call chance did not obey his voice? The fate of men, families, and even whole kingdoms, often depends on circumstances which appear to us insignificant and trifling. If we take from Providence the rule over these small events, we must at the same time suppose the greatest revolutions in the world equally independent of his government.

We know that accidents daily happen, on which our temporal happiness or misery in a great measure depends. It is evident that we cannot guard against this kind of accidents, because we cannot foresee them; but it follows, that these unexpected events ought to be particularly assigned to the will of Providence. By the wisdom or goodness of God we are left more or less to ourselves, according as we have more or less understanding and powers to conduct ourselves ration-

ally. But under circumstances wherein our prudence can be of no use, we may depend upon it, that God will more particularly watch over us. In all other cases, the endeavours and industry of man ought to concur with the aid and protection of Heaven. It is only on occasion of unforeseen accidents that Providence acts alone. As in all that we call chance, we discover visible traces of the wisdom, goodness, and justice of God, it is evident that chance itself must be subject to Divine direction. It is even there that the government of Providence shines with peculiar lustre. When the beauty, order, and plan of the world, fill us with admiration, we conclude without hesitation, that a Being infinitely wise must preside over it. With how much more reason ought we to draw this inference, when we reflect on the great events produced by accidents which no human wisdom could foresee! Have we not a thousand examples, that the happiness and lives of men, the fate of nations, the success of war, and the revolutions in kingdoms, depend on accidents entirely unforeseen? An unexpected event may confound projects concerted with the utmost prudence, and annihilate the most formidable power. It is in Providence alone that we can rest our faith, peace, and hope; with whatever evils we may be surrounded, whatever dangers may threaten us, God can deliver us by a thousand means unknown to ourselves. The lively persuasion of this comfortable truth ought, on the one hand, to inspire us with the most profound respect for the Ruler of the universe; and,

on the other, induce us to put our whole trust in God, and to look up to him on every occasion through life. This truth ought also to curb our pride, and to inspire the high and the mighty of this world with the religious fear they should have of the Great Being, in whose hands there are a thousand means, unknown to us, by which the whole structure of happiness we have proudly raised may be destroyed. Finally, this truth is admirably calculated to banish all doubt, care, and sorrow from our minds. The infinitely wise Being has a thousand wonderful ways unknown to us. They are the ways of mercy and goodness. He wishes the happiness of his children, and nothing can prevent it. He commands, and all nature obeys his voice.

NOVEMBER XXIX.

The Greatness of God.

NOTHING is more proper for man than to endeavour to form to himself ideas of God in some degree worthy of his greatness and majesty. It is true, that it is as impossible for us to comprehend him perfectly, as to contain the seas within the hollow of our hand, or to compass the heavens with a span. The Almighty is at once known to, and concealed from us. He is very near, and yet infinitely above us: near to us, as to his existence; above and concealed from us, as to his na-

ture, perfection, and decrees. But it is our duty to endeavour to know him, so as to conceive the sentiments of veneration that are so justly due to him. To assist our weakness in this respect, let us compare him with what men esteem and admire the most, and we shall see that God is infinitely above all.

We admire the power of kings, and are astonished when we hear that they have conquered vast empires, taken towns and fortresses, erected stately buildings, and been the means of happiness or misery to whole nations. But if we are struck with the power of a man, who is but dust and ashes, and most of whose exploits are due to other agents, how must we admire the power of God, who laid the foundation of the earth, who made the heavens, who holds the sun in his hand, and who sustains the immense fabric of the universe! We are with reason astonished at the heat of the sun, the impetuosity of the winds, the roaring of the sea, the rolling of the thunder, and the swift flashes of lightning; but it is God who gives heat to the sun, who thunders in the clouds, who rides upon the wings of the wind, who raises the storm, and calms the waves of the sea.

We justly respect those who have distinguished themselves by the extent of their genius and knowledge; but what is all the understanding and knowledge of man, in comparison with that of the Supreme Being, whose eye penetrates through every covering, who numbers the stars of heaven and the sand of the sea, who knows the destination of each drop of rain as it falls from the

clouds, and who, with a single glance, beholds the past, the present, and the future, at the same moment! What wisdom shines in the construction of the universe, in the course of the stars, in the plan of our globe, in the formation of the meanest worm, or the smallest flower! These are master-pieces which infinitely surpass the greatest and most perfect works of man.

We are dazzled with the splendor of riches, and we admire in palaces the magnificence of furniture, the luxury of clothes, the beauty of the apartments, and the profusion of gold, silver, and precious stones, which appears on every side. But how little is all this compared with the riches of that God whose throne is in the heavens, and whose foot-stool is the earth! The heavens are his, and the earth also, the habitable world, and all that dwell therein. He has fitted up dwellings for all creatures, and established stores for men and animals: he causes grass to grow for cattle, and corn for the service of man.

All that the world possesses, of useful or excellent, is drawn from his treasuries. Life, health, riches, glory, pleasures, all that can form the happiness of his creatures, all are in his hands, and he dispenses every thing according to his good pleasure.

We respect the potentates of the earth, when they command multitudes of subjects, and reign over many countries: but what is the corner of the earth which is subject to them, in comparison with the empire of the universe, of which our globe is but a little speck, and which extends

over all the stars of the heavens, and all their inhabitants? How great is he to whom all the monarchs of the world are servants, and who beholds about his throne cherubim and seraphim ever ready to fly to execute his commands!

We judge of the greatness of men by their actions: we celebrate the fame of kings who have built cities and palaces, governed their states well, and happily accomplished great designs. But behold the works of the most high God! the creation of the universe, the preservation of so many creatures, the wise and just government of universal empire, the redemption of mankind, the reward and punishment of every good or bad action.

Who is like unto thee, O Lord! Thou art infinitely great, thy name is celebrated, and all thy works proclaim thy grandeur. Should not a religious awe possess our souls at the thought of the presence of the Almighty Ruler of the universe, the God whose glory encompasses all our paths. As the splendor of the stars is absorbed by the rays of the sun, so all the grandeur, knowledge, power, and riches of the world vanish when compared with the glory and majesty of God. The soul is exalted and enlarged by meditating on the greatness of the Most High. Our spiritual faculties are exercised by such sublime reflections, and our minds are filled with veneration, joy, and gratitude, when, in heavenly transport, we represent to ourselves the Being of beings, the Eternal, Almighty, and Infinite God, to whom be glory and honour for ever and ever!

NOVEMBER XXX.

Motives for Contentment.

LET sweet contentment take possession of our souls. God is good: mercy and love shine through all his works. Let us contemplate his mighty deeds. The world, and all it contains, proclaim, and are worthy of, him alone.

The heavens and the earth demonstrate his power. The sun that rules by day, and the moon that shines by night, all things that have life or motion, proclaim the mighty God.

Consider the works of his hands. Men and brutes show that his glory is infinite. Even the smallest objects, the blade of grass, and the grain of sand, teach us the knowledge of the Lord.

Ask the mountains and the valleys, the heights of heaven and the depths of the ocean; the winds and the tempest; the despicable worm that crawls in the dust; and they will tell thee that his wisdom is infinite, and his power is wonderful.

How shall we worthily adore that God to whom we are indebted for our existence? Our bodies, and the souls which animate them, are the gifts of his hand; may we magnify him as long as we have a being.

Objects of his paternal care throughout the day, each morning witnesses that he has watched over us during the silent hours of darkness. Every

passing moment furnishes motives to bless Him who is the light and strength of our life.

If we be a prey to adversity, and oppressed with sorrows, scarcely do we feel their weight when God enables us to support them. He comes to our assistance, and all our difficulties are surmounted.

O my soul! thou hast long experienced this. Let me never forget it, nor give way to the fear of being deserted by a God who cannot hate his children. May I henceforth submit to his holy will, and bless him for all his dispensations, persuaded that he will accomplish all his merciful designs; for he is great in wisdom, and abundant in means.

DECEMBER I.

Hymn of Praise.

When I seriously reflect upon the unmerited mercies which thou, my God, hast conferred upon me, my soul is astonished, and filled with admiration. Overwhelmed with thy goodness, and transported with holy joy, I fervently inquire, how shall I express the emotions of a grateful heart?

While yet asleep, and unconscious of existence in my mother's womb, thy goodness fixed my lot. Thou hast regulated the condition of mortals yet unborn, and it was my fate, thanks to thy favor, to be born in a Christian land.

Compassionating my weakness, thou didst incline thine ear to my infant cries; and didst mercifully condescend to listen to my feeble accents before they were formed into praises, or into prayers.

When in the thoughtlessness of youth, I wandered from the paths of virtue, thy merciful goodness arrested my progress, revealed my error, and recalled me to a sense of duty.

In danger and distress thou hast ever been my shield and fortress; and thou hast often preserved me from the snares of vice; more to be dreaded than the worst temporal calamities.

When death spread its sable wings over my couch, and a mortal paleness was diffused over my countenance, thou didst rekindle the almost extinguished lamp of life; and when the recollection of my sins distressed my soul, thy grace afforded me the sweetest consolation.

Henceforth, in my fears, distresses, and tribulations, I will confide in thy mercy alone; and while I repose on thy wonder-working arm, I shall be enabled to contemplate even death itself without terror or amazement.

When the heavens shall pass away with a mighty noise, and the fabric of the universe shall be dissolved, I shall rise triumphantly above its ruins, and bless the omnipotent hand that has upheld me amid the wreck of a destroyed world. O my God, eternity is too short to utter all thy praise!

DECEMBER 11.

Era of the Creation of the World, and of the Human Race.

If we fix the era of the creation of the world according to the testimony of holy writ, it can scarcely have subsisted six thousand years. Those who suppose it much older, judge contrary to reason, and to the historical monuments conveyed to us. The history of mankind does not go farther back than that which has been transmitted to us by Moses; for all that has been said in regard to the origin of ancient nations is without foundation, nor does their history extend beyond the deluge. As to the chronological books of the Chinese, they are evidently full of falsehoods. The Phœnicians have no historian more ancient than Sanchoniatho, who lived after Moses. The Egyptian history does not extend beyond Ham, the son of Noah; and the books of the Jewish lawgiver are the most ancient, as well as the most authentic, of all the monuments of antiquity.

If the world were some thousands of years older, it must have been much more peopled than it is. Population has been constantly increasing since the deluge, and yet there might be three times as many inhabitants on the earth as there are at present. It has been computed, that at least five thousand millions of men might live upon our globe; and yet it is not imagined that

there are in reality much more than one thousand and eighty millions; of whom six hundred and fifty millions are computed to be in Asia, three hundred millions in Africa and America, and a hundred and thirty millions in Europe.

If we consider the arts invented by man, we shall find that few or none of them have been discovered above two or three thousand years ago. Man owes his aptitude for arts and sciences, not only to his nature and his reason, but to necessity, and a desire to procure for himself conveniences and pleasures; also to vanity and ambition, and to luxury, the child of plenty, which creates new wants. History carries us back to the time when men had scarcely invented the most necessary arts; when those arts which were discovered were very imperfectly understood; and when the first principles of science were almost totally unknown.

About four thousand years ago, men were in a great state of ignorance with respect to most subjects: and if we calculate according to the progress made since that time, and afterwards go back to the remotest period, we may, with tolerable precision, fix the epoch when men knew nothing, or, in other words, that of the creation of the human race. If their existence had been of an earlier date, it would have been impossible that the most useful and indispensable arts should have remained unknown to them for many ages. On the contrary, all that the human mind is capable of discovering must have been known long ago. From this circumstance, therefore, we may

conclude, that the era of the creation of man is that which Moses has assigned in his history. Would it not be absurd to suppose that men could have remained for thousands of years buried in the darkest ignorance, and plunged in a kind of lethargy, from which they suddenly awoke to invent arts, and to procure themselves the comforts and pleasures of life.

Another circumstance should here be mentioned. Almost all Europe was formerly covered with immense forests, and very few cities or villages were seen. Germany, for example, was but one continued forest; and its population, of course, must have been very inconsiderable. Men, at first, could only cultivate the open spaces which were found in certain parts of the forests: they had no private property in land, and annually changed their place of abode. In all Germany there was not a single fruit-tree: acorns alone were produced.

If we wish to draw a comparison between ancient and modern Germany, we must set aside all the inhabitants of towns and villages; consider the numerous colonies sent into other countries; and observe that most of the forests being now cut down, and turned into arable land, ancient Germany could scarcely have had the tenth part as much cultivation as the present, and consequently could only have had the tenth part of its present inhabitants. How many millions less of people were there then! And how abundantly must they have multiplied since! Yet the forests which extend from Germany to the north-east of

Asia, and those still remaining in Africa and America, prove that our globe is not nearly so well peopled as it might have been. The farther we go back into antiquity, the less ſhall we find the earth peopled and cultivated. Therefore it is impossible that our globe should have been eternal; for if it had been so, it must have been as well peopled as it now is from time immemorial.

All these reflections lead to that Supreme Being who is the Creator of the heavens and the earth. From him the world and its inhabitants derive their existence. Before worlds or creatures were formed He was infinitely glorious, and shall be eternally the same when new globes shall be produced.

For our consolation we may add, believers too shall live for ever. Blessed and transporting thought! When the heavens shall pass away, the Christian shall remain immoveably fixed on the Rock of ages, and while eternity rolls on, he shall inhabit the peaceful realms of celestial bliss!

DECEMBER III.

The Use of Wood.

HOWEVER great and numerous are the advantages we derive from every part of a tree, none of them can be compared with that which the wood affords us. Timber grows in such abundance,

that one might say, God daily creates new provision of it, that we may never be destitute of so useful a substance. It answers every purpose for which we design it. It is pliant enough to take any form we please; and hard enough to keep that which is once received; and as it is easily sawed, bent, and polished, it furnishes us with a variety of utensils, conveniences, and ornaments.

These, however, are not the most important advantages we derive from wood, as most of them only contribute to the purposes of convenience or luxury. We have wants still more indispensable, which we could scarcely supply without wood of a certain thickness and solidity. It is true, that nature furnishes a great quantity of heavy compact bodies: we have stones and marble, of which we make many uses; but it is so difficult to get them out of their quarries, to convey them to any distance, and to work them, that they become very expensive; whereas we can, with much less cost and trouble, procure the largest trees. By sinking into the ground wooden piles of sixty or ninety feet long, a sure foundation is made for walls, even in loose sand or mud, which would otherwise fall in. These piles strongly driven down, form a forest of immoveable, and sometimes incorruptible, trees in the ground or water, able to sustain the largest and heaviest building: other pieces support the brickwork, and all the weight of tiles and lead of which the roofs of our houses are composed.

In many countries, wood is the chief article of fuel; without which the inhabitants could neither

preserve life, nor supply one half of their necessities. It is true, that the sun is the soul of nature, but we cannot collect his rays to dress our food, or to melt our metals. Fire, in some measure, supplies the place of the sun; and the regulation of the degrees of heat depends on our own choice. The long nights of winter, the cold fogs, and the north wind, would freeze our blood, if we were deprived of the comfortable warmth of fires. How necessary therefore is fuel; and what admirable wisdom has our Creator displayed in covering so great a part of the surface of our globe with woods and forests!

But do we always consider wood, with respect to its numerous uses, as a blessing from God? Are we sensible how much it contributes to our welfare? Or, because these blessings are so common, do we therefore think them of less importance? It is true, we can acquire wood more easily than gold or diamonds; but is it therefore less a peculiar blessing of Providence? Is it not precisely the plenty of wood, and the ease with which we procure it, that ought to excite our gratitude, and lead us to bless the Creator of this invaluable gift, the measure of which is so well proportioned to our necessities? Such reflections would prove constant sources of thanksgiving, if we accustomed ourselves to this pleasing, though serious, turn of mind. Particularly at this season we are furnished with many occasions to bless God for the mercies he grants to us, and which we ought never to forget.

DECEMBER IV.

Observations on certain Animals.

We daily experience the different advantages we derive from animals. The Creator has formed some to live in a state of society with us, whilst others supply us with food; and all are designed, in one way or another, to minister to our necessities or our pleasures.

The dog is by no means a despicable creature. Exclusive of the beauty of his form, his vivacity, strength, and swiftness, he has all the internal qualities which can attract the notice of man. He possesses strong and tender feelings, which education still improves, and which render him worthy of being a companion to man. He knows how to promote his master's designs, to watch and guard him, to flatter, caress, and please in a variety of ways. Without the assistance of this faithful domestic, it would be difficult to subjugate other animals. In a word, it seems as if God had given the dog to man, as a companion, an assistant, and a guard. This interesting animal merits still further attention, from his performing many actions, which prove that he is not a mere machine, but that he possesses some principle of intelligence. How expressive are the signs by which he manifests his joy at his master's return! And how different are those that he discovers upon the approach of a robber, or a wolf,

or when he is pursuing a hare! What cautious ardour, what cunning and prudence are observable in all his motions!

The advantages we derive from the sheep are still greater, although it has not the gift of pleasing, like the dog. All the parts of a sheep are useful; its milk, wool, flesh, and even its bones. This quadruped is remarkable for chewing the cud. As it swallows its food hastily, without sufficient chewing, it brings it up again into its mouth, to chew and swallow it a second time. These animals do this because they have but one row of teeth; which defect is compensated by their having four stomachs. In the first, which is very large, and called the paunch, the food, almost whole and raw, is a little moistened. The second, which is called the cap, is much smaller. Here the food macerates better, and the digestion begins to make some progress. From thence it passes into the third stomach, called the tripe or leaf, where it remains till it is properly soaked and dissolved; for this intestine is composed of several folds or leaves, which prevent any thing from passing that is not fluid. Lastly, the digestion is completed in the fourth stomach, called the rennet bag, in which the food changes its colour, and becomes white like milk, though in the third stomach it was green.

The hare possesses instinct for its own preservation, and sagacity to escape its enemies. It makes its own form; it chooses in winter a place exposed to the south, and in summer to the north. In order to conceal itself, it hides between ridges

or hillocks nearly of its own colour. When pursued by dogs, it darts rapidly forward, then turns and returns upon its steps, throws itself into by-paths; and after many leaps and doublings, it hides itself in the trunk of a tree or in a bush. It has the cunning to change place continually, according to circumstances.

The stag is still more wily and subtle than the hare, and gives much more trouble to the huntsman. Its elegant light form, its slender shape, its ornamental horns, its height, strength, and celerity, distinguish it from the other inhabitants of the forests, which it seems formed to embellish and enliven.

When we reflect upon these and many other animals, we are compelled to acknowledge the goodness with which God has provided for our support, our convenience, and our pleasure. Our globe is the habitation of innumerable creatures, many of which are subject to man, and exist chiefly for his service. And if the soil of the earth be so diversified, it is that such a number of animated beings may find the food adapted to their different natures. All kinds of soil, good as well as bad, sandy or marshy, stony or moist, from the banks of the rivers to the tops of the mountains, are all peopled with living creatures, which, in one respect or another, are indispensable to us. The remains of our tables feed the fowls, which are so useful to us. The delicate flesh of pigeons well repays the trouble of providing them with safe and proper houses. Swans clear our ponds from a number of plants which would otherwise cor-

rupt there. Whole flocks of geese and ducks yield their feathers to us for our beds, and expect nothing in return, but a little food, and a pool where they may bathe, play, dive, and seek for worms. In a word, there is not a spot, however barren, that does not contain and feed many useful animals. Can we then ever be insensible of the numberless blessings which God has bestowed upon us?

DECEMBER V.

The Formation and different Shapes of Snow.

Snow is a species of hoar frost, differing only in this particular, that the frost falls like dew upon the surface of certain cold bodies, which draw out its moisture, and to which it adheres; whereas the snow is formed before it falls, in the middle region of the air, by congealed vapours, which observe the same laws in falling, as fogs, dew, and rain. The air is often extremely cold; and this cold may be considerably increased by the density of the atmosphere, and the accession of acid vapours. It is therefore easy to comprehend how watery particles may be frozen: but what possibly contributes more than any thing else to freeze the air, are the clouds; for it is generally very cloudy when it snows. The thicker the clouds are the more they intercept the sun's rays, and prevent their effect. In consequence

of this, the intenseness of the cold causes the vapours to lose their fluidity, and converts them into snow. But upon the same principle, ought it not sometimes to snow in summer? It may certainly happen, that even in the midst of summer, snow may be formed in the upper regions of the atmosphere; but the cold in that season is never so intense as to prevent the frozen vapours from melting, when they descend to the lower region of air, consequently they do not then appear in the form of snow. It is not the same in winter; as it is then very cold in the lower region of the atmosphere near the earth, the congealed vapours cannot receive heat enough in falling to melt them, and therefore they preserve their snowy form.

The shape of the flakes is very remarkable. They generally resemble little stars, with six equal rays. It is difficult to discover whence this regular form proceeds. Perhaps it may be imputed to the saline particles which float in the air, and, by uniting with the snow, occasion it to crystalize. Thus the frozen vapours collecting round these saline particles, which serve as a kernel to them, become formed into hexagons. Also when the lower atmosphere is very cold, these stars fall separately; but when the air is warmer, or more moist, they grow a little soft: and, if they happen to touch, they adhere together, and form flakes of different sizes, according to the number of stars which happen to meet together. This is the reason why snow never falls in large flakes when the cold is intense.

An attentive observer cannot but admire the Divine wisdom and power, when he considers that the most exact proportion and the most perfect regularity are preserved, even in the formation of snow. How surprised should we be were we to see them for the first time, and to be told that this brilliant meteor was only owing to some vapours in the atmosphere. How quickly does the snow fall, and how unexpectedly are we sometimes surrounded with it! What multitudes of flakes fall from the clouds over each other, and in a moment cover the earth! While this affords pleasure to the sight, and abundant subject for reflection, it is well calculated to justify what the pious Brooke has said: "Even frost and snow have their charms, and winter has its sweets. None can want pure and innocent pleasures, but those who are so dull and insensible, that they do not reflect on any thing, nor give any attention to the works of God."

DECEMBER VI.

Winter Plants.

It is a mistaken opinion that winter is in general destructive to plants and trees. It is, on the contrary, very certain, that the variety of heat and cold contributes much to the growth and propagation of vegetables. In the warmest climates there are immense deserts, which would

be still more barren if the burning heats were not sometimes succeeded by cold. Winter, far from being prejudicial to the fertility of the earth, is favourable to it. Even the coldest countries (notwithstanding their snow and ice) have plants which succeed very well. Many trees, as the fir, the pine, the juniper, the cedar, the larch, and box, flourish as well in winter as at any other season. House-leek, pepper-wort, marjoram, thyme, sage, lavender, wormwood, and other similar plants preserve their verdure in winter. There are even some flowers which grow under the snow. The single anemone, the early hellebore, the primrose, the hyacinth, the narcissus, the snow-drop, and all mosses, grow green in the cold. Botanists tell us, that the plants under the frigid zone, if put into a green-house, cannot bear a heat beyond thirty-eight degrees; but they can support so great a degree of cold, as to grow during the winter in Sweden, as well as in most parts of France, Germany, and Russia, and in the northern provinces of China. The vegetables of excessive cold climates cannot bear much heat, nor can those which grow on the summits of very high mountains. Rocks and mountains, whose tops are all the year covered with snow, are not without their peculiar plants. On the rocks of Lapland, many of those vegetables grow which are found on the Alps and Pyrenees, on mount Olympus, and in Spitzbergen, but no where else. When these are transplanted into gardens, they grow to a tolerable height, but bear very little fruit: and few of the plants which

thrive in the northern countries, will come to perfection without snow.

Thus, we find that there is no soil in the immense garden of nature entirely barren. From the finest dust to the hardest rock, from under the line to the north pole, there is no land which does not produce and nourish plants peculiar to itself. And no season is absolutely destitute of flowers or fruit.

Merciful and beneficent Creator! grant that, even in this severe season, we may have a due sense of thy paternal goodness, and the blessings bestowed upon us! Were we properly attentive to the government of thy Providence, we should every where find occasion to acknowledge thy goodness and wisdom. Nature is never idle, but at all seasons continues her useful labours. Grant, O God, that it may be the same with us; and, should we be spared to old age, enable us to bring forth fruit acceptable to thyself and beneficial to our fellow-creatures!

DECEMBER VII.

An Exhortation to remember the Poor during the Severity of Winter.

You who are sitting at your ease in convenient and comfortable apartments, whilst the keen north wind whistles round your habitation, reflect on the state of those unfortunate beings who are

at this moment suffering the utmost severity of cold and hunger. "Happy are those who in this inclement season have a house to shelter them, clothes to cover them, bread and the fruit of the vine to refresh them, with a bed of down on which they may repose and yield to pleasing dreams. But hard is the lot of the poor man to whom fortune refuses even the necessaries of life! without clothes or shelter, often stretched upon a bed of pain, and too modest to proclaim his wants." We ought all to be deeply affected with the misery of such people. How many poor creatures in the streets are now shivering with cold, and perishing for want of food! How many old people, with scarcely any thing to cover them, exposing themselves for hours together to the inclemency of the weather in order to solicit the charity of passengers! How many sick persons are there without food or medicine, lying on straw, in miserable cabins or garrets, where the wind, the rain, and the snow are their principal visitants!

Winter renders benevolence to the poor the more necessary, because it increases their wants. Is it not the time in which nature itself is poor? And is it not adding double value to our benefactions to bestow them seasonably? If we have been enriched by the fruits of summer and autumn, is it not that we should share them with our fellow-creatures, when nature is in a state of repose? In proportion as the cold increases, we should be more anxious to relieve the necessitous, and to pour some part of our abundance

into the bosom of the deserving poor. What intention could Divine Providence have in its unequal distribution of earthly riches, but to enable the sons of affluence to relieve the necessities of their fellow-creatures?

Let us therefore have compassion on the poor, and recollect that it is an indispensable duty to alleviate their sufferings. Providence has conferred an honour and a privilege on the opulent in enabling them to clothe, to feed, and to cherish objects of distress. Let those, therefore, on whom fortune has heaped her favours, give liberally from their ample stores; and let those who have but little still give a part; for there are few persons, however confined their income, that have not the means of doing some good. Let us then enjoy the sweetest satisfaction that a noble mind can feel;—the matchless pleasure of relieving the wants of others, of softening and lessening their weight of adversity. How easy is it to do this! We need only retract a few of our expenses in dress and pleasures. How acceptable an offering would it be to God, were our benevolence to be attended by a conquest over our passions, in retrenching the indulgence of luxury and vanity, in order to bestow our charity on the poor!

DECEMBER VIII.

Nature is a School for the Heart.

The study of nature is in all respects profitable, and it may with propriety be termed a school for the heart, since it clearly instructs us in the duties we owe to God, to our neighbour, and to ourselves. Can any thing inspire us with more profound veneration for God than the reflection that it is he who has not only formed our globe out of nothing, but that his Almighty hand confines the sun within its orb, and the sea within its bounds? Can we humble ourselves too much before that Being who created the innumerable worlds which roll over our heads? What diminutive creatures are we in comparison with those immense globes! and how little must the earth in all its glory appear, when considered in this point of view! Must we not shudder at the very thought of offending this God, whose boundless power is every where manifested, and who with a single frown can seal our destruction, or render us completely miserable!

But the contemplation of nature is also calculated to fill us with love and gratitude towards its divine Author. All nature loudly proclaims this comfortable truth, that "God is love." It was love which induced him to create the world, and to communicate to other beings a portion of that felicity which he himself enjoys. For this

purpose, he created the universe, and an innumerable multitude of creatures, that all of them, from the archangel to the worm, should feel, according to its nature and capacity, the effects of infinite goodness. Each created being affords incontestable proofs of this assertion. But its veracity is most demonstrated by ourselves; the Creator having endowed us with reason, not only to enjoy the blessings we receive, but also to feel and acknowledge that love which is the source of all our comforts. He ordained that we should have dominion over the animals, to make them subservient to our wants and conveniences. And for us he has caused the earth to yield her fruits in such abundance. Can we then be insensible of so many daily blessings, to which we owe the continuance of our existence; or is it possible to remain unaffected by the disinterested love of this Great Being, who can receive no return from his creatures, and whose felicity can admit of no increase? Must it not excite the most grateful love for our bountiful Creator?

The contemplation of the universe, and the perfections of God so clearly manifested in it, ought to increase our confidence in this divine Friend and Benefactor. And the most perfect tranquillity should fill our souls when we recollect that our destiny is in the hands of a Being, whose wisdom, power, and goodness are visibly inscribed on every part of the creation. In the hour of perplexity, embarrassment, and danger, let us therefore address the prayer of faith to Him who has stretched out the heavens and formed all

his creatures in so admirable a manner; and let us rest assured that his omnipotent arm will be stretched out on our behalf.

I cannot conceive it possible for mean and selfish sentiments to fill the heart of a man, who, in the contemplation of nature, must every where discover traces of infinite beneficence in the Supreme Being, who does not less propose the happiness of each individual, than the universal good of the world. If we reflect on the ways of Providence, it is impossible not to be sensibly touched with the goodness and mercy of God towards every living creature; and that heart must be depraved to an awful degree, which is not inspired to imitate, as much as possible, his universal benevolence; for "God maketh his sun to rise on the evil and on the good, and sendeth his rain on the just and on the unjust." Let us then exclude none from our charity, nor act with partiality in the distribution of it. Our God regards the little as well as the great, the indigent as well as the affluent, and invariably does good to all. If, therefore, we wish to imitate our heavenly Father, we must endeavour to kindle a flame of pure and extensive philanthropy within our hearts.

Finally, when we contemplate the admirable order which reigns throughout all nature, ought it not to produce the best dispositions in our minds? If we are convinced that nothing can be pleasing to God, which is contrary to order and regularity, should we not conform to it? How unpardonable to oppose, by our irregu-

larities, the merciful designs of Providence in our favour! Ought we not to second them by our endeavours to correct ourselves? It is by these means that nature becomes an excellent school for the heart. If we listen to its voice, we shall learn the true wisdom which leads to everlasting happiness.

DECEMBER IX.

God's Goodness manifested towards us even in those Things which appear hurtful.

Most people wish that they were not exposed to any evils. If they had their choice they would endeavour to secure to themselves a life exempt from all care and inquietude. But should we be really happy if nothing occurred to disturb our tranquillity; or if, through our lives, there were to be no vicissitudes of sad and pleasing events? This question, on the decision of which depends our peace in this world, is worth examining; while we should at the same time guard as much as possible against the delusions of self-love.

Should we be really happy if we experienced uninterrupted prosperity? I do not believe we should. A constant state of enjoyment would soon grow insipid, and disgust would change our felicity into real misery. On the contrary, the evils we sometimes meet with, enhance the value of our blessings, as colours are relieved and set

off by shade. If there were no winter, should we be as sensible as we are of the charms of spring? Should we know the value of health without sickness, the sweets of repose without labour, or the peace and consolation of a good conscience, if we had never been tried and tempted? The more obstacles there are to our happiness, the greater is our joy when we surmount them. The heavier our misfortunes are, the more happy we feel when delivered from them. If all our days were prosperous, we should probably abandon ourselves to luxury, pride, and ambition. Were it not for necessity, nobody would take the trouble to be active or laborious in business; none would make use of their talents, cultivate their minds, nor be animated with zeal for the public good. If we were never liable to danger, how should we become prudent, or how should we learn compassion? If we had no evils to fear, how easily should we be intoxicated with happiness, and forget our gratitude to God, charity towards our neighbour, and all our duties in general.

Are not then these virtues, these blessings of the soul, a thousand times preferable to a constant train of pleasing sensations, which would assuredly become dull and insipid by possession? He who constantly reposes in the lap of felicity, soon grows negligent of doing good, and is incapable of any great action: but let him feel the strokes of adversity, and he will recover his wisdom, activity, and virtue.

How unjust and inconsistent are the desires of

men! They wish to live quiet, contented, and happy; and yet are discontented with the means which lead to the accomplishment of their own desires! In the heat of summer we sigh for coolness; yet we are displeased when we see the clouds collect which are to obtain for us the refreshing breeze. Thunder-storms purify the air, and make the earth fruitful; yet we complain that the flashes of lightning terrify our minds. We acknowledge the use of coals, minerals, and baths; but we dislike earthquakes. We wish that there were no infectious or epidemical disorders; and yet we complain of the storms which prevent the air from corrupting. We wish to be attended by servants, and yet are unwilling that there should be in the world either poverty, or inequality of rank. In a word, we are desirous of having every end accomplished, without the use of the means which lead to it.

Let these reflections lead us to acknowledge the wise and beneficent designs of God, even when he permits us to be tried by the frequent vicissitudes of joy and sorrow, of prosperity and adversity. Is he not the Arbiter of our fate; the Father, of whose goodness we ought to be convinced, even when he thinks proper to chastise us? Are we not in a world subject by nature to revolutions? Have we not often experienced, in the course of our lives, that what our ignorance made us consider as an evil, has in reality proved a mean of happiness? Let us then receive with calm resignation such afflictions as the Almighty may see fit to dispense. They will only appear

terrible at first: the longer we are exercised by them, the more supportable will they become, and the more we shall perceive their salutary effects. If in the season of adversity, we exercise our faith and patient hope, we shall eventually be enabled to bless God even for our trials and afflictions. In a future state we shall undoubtedly do so, and shall form a very different opinion of the troubles we have undergone in this world. We shall then be convinced, that without these afflictions, which we now lament, we should never have obtained the happiness designed for us.

DECEMBER X.

Incidental Revolutions of our Globe.

NATURE every day produces changes on the surface of the earth which have a considerable influence on the whole globe. Many ancient monuments prove, that its surface in several places sinks down more or less, sometimes slowly, sometimes rapidly. The wall built by the Romans in Scotland in the second century, which extended across the whole country, is at present almost entirely buried under ground; and remains of it are frequently discovered. Even mountains, those pillars of the earth, are exposed to the same overthrow, occasioned either by the nature of the ground, the waters which undermine

and sap them, or by subterraneous fires. But when some parts of the globe sink down, there are others, on the contrary, which rise up. A fertile valley, at the end of a century, may be converted into a marsh, where clay, turf, and other substances, form layers one over another. Lakes and gulfs are converted into dry land. In stagnant water, rushes, weeds, and different plants grow; while both animal and vegetable substances putrify in them, and gradually form a sort of mud or mould, till at length the bottom becomes so much raised, that the place of the water is occupied by solid earth.

Subterraneous fires also produce great changes on our globe. Their effects are shown by three different commotions, which are generally felt separately, but which sometimes come altogether. The first consists in a horizontal motion backward and forward. When these oscillations are violent and uneven, they throw down buildings, and overturn every thing. These undulating commotions, are particularly observed in waters. There are other earthquakes, called shocks, or tossings, which sometimes cause new islands to rise suddenly from the bottom of the sea. The outward crust of the earth being lifted up with great violence, falls down again, sinks in deeper chasms, and thus forms lakes, marshes, and springs. Lastly, there are explosions, like the springing of a mine, accompanied by eruptions of inflammable matter. These violent shocks and convulsions occasion great devastation, and make considerable changes on the surface of our planet. The outer coat

of the earth breaks in different places, sinks in on one side, and rises up on the other. The sea also partakes of these commotions; and the most sensible effect that appears from them is the formation of new islands. These are produced by the elevation of the bottom of the sea; or they are composed of pumice stones, calcined rocks, and other substances thrown out from some volcano. History informs us that through earthquakes, occasioned by subterraneous fires, whole cities have been swallowed up, and buried sixty feet under ground; so that the earth which covered them was afterwards sowed and cultivated.

Many of the alterations produced on our globe have been caused by the undermining of waters. Heavy rains soak into the mountains, and loosen much earth from them; which being swept away into the sea and the rivers, raises the bottom of them considerably. The course of rivers is often changed, and the coasts themselves are sometimes displaced. Sometimes the sea retires and leaves whole countries dry, which were formerly its bed; at other times it encroaches upon the shore, and whole provinces are completely inundated. Kingdoms that were formerly close to the sea, are at present at a great distance from it. Anchors, and great iron rings to moor vessels, and the remains of ships found upon mountains, and in marshes, at a great distance from the ocean, prove beyond a doubt that many places which are now dry land were formerly covered by the sea. There is every reason to believe that

England was formerly united to France: the beds of the earth and stone, which are the same on both sides of the Channel, and the shallowness of that strait, seem to prove it.

Climates also occasion great revolutions upon our globe. Between the tropics, the heats and rains are alternate; in some places it rains for several months successively, and at other times the heat is excessive. Countries in the vicinity of the poles are exposed to great changes by the severity of cold. In autumn the water penetrates through a multitude of little crevices into the rocks and mountains; there it freezes in winter, and the ice dilating and bursting causes great havock.

Such revolutions, produced by accidental causes, demonstrate the frailty of the world itself. They also prove that God is not an idle spectator of the alterations which take place on our globe; but that he plans and directs the whole by laws infinitely wise. Hence we may also learn, that all things here below are subject to constant vicissitudes. We may even observe, that frequent accidental changes give a new face, not only to the inanimate, but to the animated part of the creation. One generation disappears and gives place to another. Amongst men, there are some who rise, while others fall. Some are raised to honours and dignity, while others sink into poverty and contempt. There are continual migrations and changes of situation amongst creatures; visible differences and gradations in their condition and faculties. God has allotted to all beings

different periods of duration. Some are designed for a short and momentary existence, others for a longer duration, and some for everlasting life. In all this, how evidently do the wisdom, power, and goodness of the Creator shine forth!

DECEMBER XI.

Sentiments of Gratitude for our Clothing.

The goodness of Providence appears even in our clothing. How many animals bestow upon us their skins, their hair, and their fur, for this purpose! The sheep alone, with its wool, furnishes the most necessary part of our dress; and it is to the valuable labours of a worm that we owe our silks. How many plants also do we find of use in this respect! Hemp and flax furnish us with linen, and many different stuffs are formed of cotton; but even these vast stores of nature would have been insufficient, if God had not endowed man with industry, and with an inexhaustible fund of invention, to contrive and prepare clothing of different kinds. If we only reflect upon the labour requisite to produce a single piece of cloth, we shall find that the united exertions of many hands are indispensably necessary to prepare even a few yards. And surely we have but little cause to be vain of our dress, since we are compelled, in obtaining it, to have recourse not only to the animals most contempt-

ible in our eyes, but also to the rank of people our pride disdains the most.

But why has the Creator obliged us to provide ourselves with clothing, while all animals receive theirs immediately from nature? I reply, that this necessity is very advantageous to us; as being favourable to our health, and adapted to our mode of life. We may by this means regulate our dress according to the season of the year, the climate in which we live, and the profession or employment in which we are engaged. Our clothes promote that insensible perspiration which is so essential to the preservation of life; and the necessity we are under of obtaining them for ourselves, has exercised the human mind, and given rise to the invention of many arts. And, lastly, the labour they require, provides subsistence for a number of workmen. We have, therefore, great reason to be contented with this arrangement of Providence: let us only take care not to frustrate the designs proposed by it. A good Christian ought never to glory in the external ornaments of his body, but rather in the inward qualities of the mind. Pride assumes a variety of forms; it is elated by the most trifling advantages, and seeks for applause where none is merited. And, in regard to outward appearance, some show their pride in the splendor of their silks, gold, and jewels, whilst others nourish it under rags. The true Christian will avoid both these extremes; and the former he will consider as the grossest absurdity; since it is degrading to human nature to glory in ex-

ternal ornaments. We wear clothes to preserve us from the intemperance of the air, to distinguish the sexes, and to establish those distinctions which are requisite in the different orders of society. These are the rational ends for which, since the fall of man, our garments have been designed; and we should use them only for the fulfilment of these designs.

DECEMBER XII.

The Clothing of Animals.

It is a wonderful arrangement of Divine Providence, that all animals are naturally provided with those coverings which are best adapted to their situation and manner of life. Some are covered with hair, some with feathers, and others with scales and shells. This variety is an indubitable proof that a wise artist has prepared their clothing; for it is not only adapted in general to the different species, but appropriated to each individual. Hair is the most convenient clothing for quadrupeds. Nature in giving it to them has likewise so formed the texture of their skin, that they can easily lie down on the ground in any weather, and be employed in the service of man. The thick fur of some animals not only guards them from wet and cold, but also serves to cover their young, and to provide them with a soft bed.

For birds, and some sorts of insects, feathers form the most convenient clothing. Besides protecting them from cold and wet, they are ranged in the manner most proper to support them in the air. On this account they are spread over the whole body, and their delicate texture is peculiarly favourable to flight. They are light and hollow, and their quills contain a marrowy substance, which strengthens them: while the capillary filaments, curiously interwoven, render them thick enough to maintain the heat of the body, to preserve them from the inclemency of the weather, and to give the wings a sufficient degree of strength.

The clothing of reptiles is perfectly adapted to their mode of life. Observe, for example, the earth-worm. Its body is composed of a series of little rings, and each ring is furnished with a certain number of muscles, by means of which it can extend or contract its body at pleasure. These creatures have under their skin a glutinous juice, which exudes and makes their bodies slip under ground, which they could not do if they were covered with hair, feathers, or scales.

The substance which covers aquatic animals is equally adapted to the element they inhabit. Fish could have no clothing more convenient than scales, the form, hardness, size, number, and position of which are perfectly suited to their way of living. Nor could shell-fish have been better clothed or housed than they are.

The beauty of these various kinds of covering is also very remarkable; particularly in some

species of birds and insects. If we observe the butterflies, their beauty must strike us with surprise and admiration: some are drest with the sweetest simplicity, while others exhibit a profusion of the most brilliant colours. And how greatly has nature diversified the beauty and plumage of birds! The little humming bird of America is one of the wonders of nature. It is not larger than a bee, but of so beautiful a plumage, that its head and wings resemble the rainbow. Its neck is of a bright ruby red; the belly and under part of the wings are of a gold colour; the thighs are green as an emerald, and the feet and bill black as ebony. The males have a small tuft upon their heads, composed of all the colours that adorn the rest of the body, and which are worn as pendants in the ears of the Mexican ladies.

It is impossible not to suppose, that in the coverings of birds God had in view their convenience, use, and beauty. Every animal has that kind of dress which is most suitable. Nothing is superfluous, nothing wanting; but every thing is so planned, and so complete, even in the lowest creature, that the whole art of man cannot imitate it. Does not this demonstrate the existence of a Being whose infinite wisdom unites with unlimited goodness, to render each creature as happy as its nature and design will permit?

DECEMBER XIII.

Thoughts on the Ravages of Winter.

I HEAR the winds and the tempests roar; and my blood is almost frozen in my veins. The gloominess of the day, its almost extinguished light, and the fearful misgivings of my own heart, all concur to render this tumult and disorder in nature particularly dreadful. How often has the wind blown down cottages, and even palaces; thus in a moment destroying the labour of years! How often has it plunged into the abyss, ships, and the unhappy beings who hazarded their lives on such frail foundations! How often has it torn up by the roots the stately oak! But thou, O God! art the Creator and Ruler of all things. The tempest and the northern blast are thy messengers, the heralds of thy power, and the ministers of thy will. If thou didst not set bounds to their destructive effects, they would every where, and at all times, occasion the same mischief; and yet we behold the poor cottage, which nothing shelters from their fury, still standing. Thanks to Divine Power, which rebukes the wind and the sea! Thanks to that Wisdom which has ordained all things for the best!

Here it may be asked, why the mischief which storms and tempests occasion should be permitted, if the world and all the events of it, are the works

of Infinite Wisdom? Can Perfect Wisdom produce any thing but order, Perfect Goodness any thing that is bad? Or is it thus that frail humanity may reason? But what is man, that he dare dispute with God? Shall the creature say to his Creator, Why hast thou made me thus? And, because we cannot comprehend the works of God, does it therefore follow that they are destructive? In order to judge of them, and of the purposes for which they were designed, we should equal him in knowledge and wisdom. It is, indeed, wonderful that we are able to perceive a part of the order he has established, or to comprehend even a little of this wise and extensive plan; and, considering our want of understanding, it is a miracle that things do not appear still more confusedly to us. Alas! all would be disorder and confusion; there would be neither order, harmony, nor happiness in the universe, were it not for the existence of a Being whose wisdom, goodness, and power surpass all our conceptions; and who created the world and all things in it. If the general plan, and common course of nature, visibly tend to the welfare of all created beings, whatever particular accidents may seem to contradict the design, only prove our ignorance and the limited state of our understanding. To form one whole out of the materials of which the visible world is composed, wherein such magnificent phenomena appear, wherein are displayed the several beauties and treasures of knowledge, virtue, and felicity which are displayed before our eyes, is a work so wonderful and divine, as none

could have conceived or executed, but an Omniscient, Almighty, and Perfect Being.

The farther we advance in the researches of nature's works, the more clearly we distinguish the wisdom and goodness which govern the whole. On these principles, we shall judge very differently from what we should otherwise do, in respect to the ravages of winter. Even the storms, the snow, the frost, and all that appears at this season so disagreeable, are linked together in the everlasting order of things. Every thing has its cause, and comes precisely at the appointed time; and by means of these revolutions, Divine Wisdom preserves uninjured the harmony of the universe. The wind, which terrifies the mariner at sea, drives the water upon barren lands. The sulphureous vapours, salts, and other matter, driven by the winds from one country to another, refresh the earth, and restore fertility. Thus the winter, which appears so destructive, enables our fields to produce new crops.

At present the ground, the meadows, and the gardens are buried under the ice and snow; the inhabitants of the forest howl more hideously than usual; the wild beasts are oppressed with hunger; and the whole world appears dead. But God preserves the earth under this apparent death, and watches over fainting nature. What miracles does he perform amidst the gloomy scenes of winter! The sparrow which can no longer find food, lives, notwithstanding, in the place of its retreat, upon the gifts of Divine be-

neficence. The earth no longer yields her various productions, but the Creator's hand, which is never closed, provides the necessaries of life, and he calls into being things which at present have no existence.

DECEMBER XIV.

Sagacity of Animals in procuring Subsistence for the Winter.

THERE are some animals which lay up stores for winter, and in their harvest-time prepare provisions for six months. It might be supposed they foresaw a season in which they could not gather food; and that, guarding against future wants, they knew how to calculate the quantity which would be requisite, both for their own consumption, and for that of their families.

Amongst insects, bees are almost the only species that lay up provisions for the winter. They are very economical in the use of their wax, as they know they can gather no more when the season for flowers is over, and have then no other resources for subsistence, or for making their cells, but what they have already collected. They have also the prudence to gather another kind of substance, which they require to keep out the cold from their hives: this is a glutinous substance, collected from flowers and bitter plants, which they use in stopping up every crevice in

their hives. They waste nothing, and what they do not want at the present, they reserve for the future. Those who have narrowly observed them assure us, that, when in winter they uncover the honey-combs, they carry off the wax with which the cells were closed, and lay it up for future use.

Among quadrupeds the hamster and field mouse are those which lay up winter provisions, and, in harvest-time, convey a quantity of grain to their subterraneous habitations. Amongst birds, magpies and jays collect acorns during the autumn, and preserve them against the inclement season in hollow trees. The animals that sleep all the winter lay up no provisions, as they would be useless; but the others are not content with providing for the present moment, they think also of the future, and it has never been observed that they failed in collecting a sufficient quantity.

These economical cares cannot be the result of reflection, for that would be to suppose animals endowed with much more intelligence than they really possess. In fact, they only think of the present, and of whatever affects their senses agreeably or disagreeably. And if the present have any reference to the future, it is without any design or consciousness of theirs. How, indeed, can there be any foresight or reflection in this instinct of animals, when they have no experience of the changes of seasons, or the nature of winter; and when, having no idea of measuring time, they neither know when winter will come,

nor how long it will continue? Nor can they be supposed to have any reason or ideas of futurity, or to seek means of subsisting during the severe season from reflection; since they always act invariably the same, and each species follows constantly and naturally the same method, without any instruction.

For example, when the industrious bees go on collecting honey and wax, and filling their magazines with them as long as the season permits, it is not because they foresee that a time will come in which they can collect no more. How should creatures, which have only sensual perceptions, judge of futurity? Nature prompts them to gather wax and honey; to labour during the fine weather; and by the time winter comes, they have generally filled their magazines. These animals, like all others, act blindly, and almost mechanically, without reflection or design, though they appear to be led by the rules of wisdom and prudence. Being then void of reason, this wise economy, this appearance of foresight and reflection, must necessarily be the consequence of a Superior Intelligence, whose views they fulfil without knowing it.

In this consists part of our superiority over the brute creation. We can represent to our minds the past and the future. We can act from reflection, and form plans. We can determine through motives, and choose what is most suitable. But how important is it that we should make a proper use of these prerogatives! Informed as we are of the great revolutions which

await us, and being enabled to look forward to the winter of life, ought we not to lay up for ourselves a store of consolations which may render our latter days not only supportable, but happy? Nothing can be more miserable than an old person who has passed his best days with a careless indifference about futurity, and finds himself in the winter of life, devoid of every resource and comfort. Let us not imitate such inconsiderate conduct; but let us immediately adopt those measures which may render our old age truly comfortable, and gild our path with the rays of joy as we pass into eternity.

DECEMBER XV.

Advantages of Winter.

Let us reflect on the blessings which God grants us in this severe season. The frost and cold prevent many hurtful vapours in the higher regions of the atmosphere from falling upon us, and even purify the air. Far from being prejudicial to our health, they often improve it, and preserve our humours from that putrefaction, which a constant heat would certainly produce. If the vapours which collect in the atmosphere were always to fall in rain, the earth would become too soft and wet, the roads would be rendered impassable, and our bodies would be too much relaxed; whereas

the cold braces them, and promotes the circulation of the blood. In very hot countries, and in those where there is much rain during the winter, severe and dangerous diseases are much more frequent than in other places. Travellers inform us, that in Greenland, where the country is covered with mountains of ice, and where in winter the days are only four or five hours long, the air is very wholesome, clear, and light: and, except a few complaints in the chest and eyes, occasioned partly by the quality of the food, the disorders most common in Europe are very rarely met with. It is also certain, that the constitution of the human body varies according to the difference of climates; consequently the inhabitants of the northern countries have constitutions adapted to extreme cold, and are generally strong and robust. As man, though active by choice, and though labour is necessary to him, is still glad to interrupt his employments to taste the sweets of sleep; so also does our nature yield to the change of seasons, and takes a pleasure in it, because, in reality, it contributes towards our welfare and happiness.

Behold the fields and gardens! They are at present buried in snow; but this is necessary, in order to preserve them from the cold, as well as to prevent the grain from corrupting. The earth requires repose, after having yielded in the summer all that we want for the winter. If our present support had not been provided for, if in this severe season we were obliged to cultivate the

earth, there might be some foundation for complaint. But all our wants are supplied, and we enjoy a repose suitable to the season.

How tender are the mercies of Providence during these winter months! God has endued men with that industry which is requisite to defend themselves from the cold and frost. Their inventive minds have found the means of procuring an artificial warmth, by which they enjoy in their apartments some of the comforts of summer. The care of Providence is no less visible in the annual produce of wood, and its astonishing increase, than in the fertility of our fields. We have also many animals at our command that are very useful in enabling us to support the severity of the season. And the colder the country, the more numerous are those useful creatures whose furs are designed to keep us warm. Is it not therefore evident that Divine Wisdom foresaw the several wants of different countries, and designed to relieve them by placing animals in them which could live no where else?

Winter does not interrupt trade, nor the exercise of professions: for though the rivers, in many places, have lost their fluidity, their surface, solid as a rock, is converted into a road, where carriages may pass in safety. Men are not condemned to inaction or idleness during this season; for if they are obliged to suspend the labours of the field, they have a thousand ways of employing themselves usefully in domestic life. The repose of nature prompts them to muse upon themselves. It is true, they can no longer behold

the beauties of spring and summer; but their minds may be so much the more at liberty to reflect, even in the darkness of night, upon the instability of all earthly things, which may lead them to a firm resolution of devoting themselves to the service of that Great Being who is immutable. Man is now at leisure in his calm retreat to cultivate his mind, to examine his heart, to correct his faults, and to lay up treasures of good works. Happy should we be if we made so good a use of this season! If during the gloomy months of winter, we do not reap our fields, gather in the vintage, nor cultivate our gardens; we may at least improve our minds, and endeavour to render ourselves serviceable to our fellow-creatures. However rigorous the season may be, it may notwithstanding afford us abundant reasons to adore our Creator, to acknowledge his mercies, and to trust in his good providence.

DECEMBER XVI.

The Elements.

Whether we consider the universe as a whole, or examine its different parts separately, we shall find equal reason to admire the power and wisdom of the Creator. It is true, that we have but a very imperfect knowledge of things, and can seldom go beyond conjecture and probability. But this is sufficient to prove to us, on one hand, the

greatness of God, and, on the other, the weakness of our reason. Perhaps all the elements are of the same nature, and may be reduced to a single essence, so combined as to form but one whole. But as it would be very difficult to consider the elements in this point of view, it is necessary to divide them, and consider separately the primitive parts of which they are composed.

How various and admirable are the properties of the air, which we every moment respire! With what force does it divide and dissolve all sorts of substances, contrasting, at the same time, their different qualities! The innumerable vapours and exhalations which blend and unite with it, render it sometimes hurtful, but in general wholesome and good. Those foreign particles with which the air is loaded, its elasticity, the property it has of rarefying, of condensing, and of recovering its natural state, produce those meteors which disperse the noxious vapours, purify the atmosphere, and promote the vegetation of plants. And though the effects of the air are sometimes severe, they are absolutely necessary to prevent the earth from becoming a barren desert. There are, however, in this element, as in all God's works, impenetrable mysteries. Who, for example, can explain, how the particles of air, though so subtile as entirely to escape our sight, are the means by which every other object becomes visible? What can be more wonderful than the equilibrium between the outward air and that which is within our bodies, a balance on which our health and even life depends? And who

can sufficiently admire, that one and the same element should be the medium through which sounds, light, and odours, should be transmitted to us?

Water has a great conformity with air; and its properties and effects are not less various and admirable. How many different qualities has God given to this element! All the abundance and salubrity of the air, all the richness of the earth, and the warmth of fire, could no save us from perishing, if we were destituteo f water. Of how many changes is it susceptible! Who has given it the property of dilating, dividing, and rarefying to such a degree, that it can rise to the height of a league in the atmosphere, form itself into fogs and clouds, and there continue suspended? Who has given it the power of penetrating into plants, of again passing out through their insensible pores, and of diffusing itself over our fields and valleys in the form of a refreshing dew? How astonishing is the property it has of becoming sometimes lighter than air, though a quantity of water is nearly nine hundred times heavier than an equal quantity of air; of resuming afterwards its natural weight, of attaching itself to other bodies, of dissolving the most compact substances, and of even uniting with fire!

Of all the elements, we know the least of the nature of fire. It is too subtile for our eyes, but its qualities, properties, and effects, are sufficiently obvious. Whether the essence of fire consist in motion only, or in the fermentation of what we call inflammable matter, or whether (as many

experiments render probable) it be a simple substance different in its nature from all other bodies, it is certain, that its prodigious abundance, its uses, and its wonderful effects, deserve our utmost attention. There is nothing, however cold, that does not contain fiery particles, capable of ignition. Fire exists every where: in the air we breathe, in the water we drink, and in the earth which supports us. It is a part of the composition of all bodies; it penetrates their smallest pores; it unites closely with them; it moves with them from one place to another; and however confined, does not fail to discover itself. How forcibly does it dilate the air which surrounds it, whilst the air, in its turn, nourishes the fire, and renders it more active! It gives fluidity to the water, fertility to the earth, health to mankind, and life to all animals.

Earth, when pure, is distinguished from other bodies by having neither taste nor smell, by being insoluble either in water or spirits of wine, and being easily bruised between the fingers. At first sight, it appears very different from the other elements, and it has so much conformity with them, that some naturalists believe that water is nothing but dissolved earth, and that the earth is water in a condensed state. According to this system, the water is constantly diminishing upon our globe, and gradually forming compact bodies; because formerly our planet was only a wet and fluid mass, and, in still more remote times, nothing but water.

All the elements are necessary to our existence

and preservation; and if we reflect on their properties, and the variety of effects they produce, we shall find them all worthy of our admiration. How many properties different from each other has the Almighty given to his works! How many agents in heaven, and upon earth, are always in motion for the preservation of the universe in general, and of each individual in particular! What wonderful revolutions, what phenomena, are produced by the mere combination of the elements! It would be easier to number God's creatures, than to calculate all the forces which are in action. How infinitely great then must that Power be, from which they all proceed! They all depend upon the will of an Almighty Creator. He has formed the whole; and impressed upon each a constant, uniform, and salutary motion. It is he who maintains the elements in that equilibrium to which the world owes its preservation. To Him, therefore, let us ascribe eternal honour, glory, and praise.

DECEMBER XVII.

The Sun's Influence on the Earth.

The sun is the constant source of that light which is so abundantly diffused over our globe. This light of the sun is the most subtile fire; it penetrates all bodies; and, when in sufficient quantity, it puts all their parts into motion, attenuates and

decomposes them, dissolves those that are solid, rarefies those that are fluid, and thus adapts them to an infinity of motions.

Is it not evident, that on this variety of influence which the sun has on bodies, most of the phenomena and revolutions of our globe must depend? When the force of the sun's light increases, that is, when the rays fall less obliquely, and in a greater quantity, on a given space, and continue longer each day, as is the case in summer, this must necessarily produce considerable changes both in the atmosphere and on the surface of the earth. On the other hand, when the rays fall more obliquely, consequently more feeble, and, the days being shorter, their action is less prolonged, as in winter, what different changes are observable both on the earth and in the atmosphere! What a gradual alteration do we perceive, when from the remote sign of capricorn, the sun advances nearer to the equinoctial line, till the days and nights become of equal length! And how many new phenomena appear when this luminous and active body returns in summer from the tropic of cancer towards the line, till the days and nights become again equal in autumn, and the sun removes from our zenith!

It is on the distance of this luminary that all the variations depend which we observe in the vegetation of plants, and the internal constitution of bodies in all climates, and at every season. Hence each season and climate has plants and animals peculiar to itself; and the progress of vegetation is more or less rapid, and the productions of nature

continue a longer or shorter space of time; but it would be impossible to describe, or even to point out, all the different effects of the sun upon our earth. All the changes and revolutions of the globe have their principle in the influence of the sun; for the different degrees of heat and cold depend chiefly upon this luminary. I say *chiefly*, because the nature of the soil, the different heights and positions of mountains, and other circumstances may contribute towards a country's being more or less cold, and more or less subject to rain, wind, and other variations of the atmosphere. But it remains certain, that these accessory causes would not be sufficient to produce the effects observable in many places and at different times. For these effects would not be produced if the heat of the sun did not act in the manner it does.

It requires but very little attention to be convinced of the numerous and sensible effects of which the sun is the primary cause. At one time he rarefies, at another condenses, the air; sometimes he raises vapours and fogs, and sometimes compresses them together, in order to form them into different meteors. He gives circulation to the sap in trees and vegetables, which causes the leaves and blossoms to unfold, and ripens the latter into fruit. He animates all nature, and is the source of that vivifying warmth which gives to organized bodies the power of developing themselves, and of growing to perfection. He operates even in the depths under ground, where he produces metals, and gives life to animals. He even

penetrates into rocks and mountains, and his influence reaches to the bottom of the sea. This alone might suffice to convince us of the power of God; but if we consider with how much art he has drawn a multitude of great effects from the same instrument, and produced so many phenomena of nature from the mere heat of the sun, we shall be still more sensibly persuaded, that nothing but Infinite Wisdom, united with boundless power, could ever have effected such wonders. Would mankind deserve to be enlightened, warmed, and cheered by the sun, if in these salutary effects of its influence, they did not acknowledge the glorious perfections of the Supreme Being? and if they did not adore him with the most profound veneration?

DECEMBER XVIII.

Winter Rains.

How different are the cold rains which fall at this season, from those warm refreshing showers which in summer embellished and fertilized the earth. This change gives a melancholy appearance to nature. The sun is veiled, and the whole sky appears like one immense cloud. Our prospects are confined; for a gloomy obscurity surrounds us, and we are threatened by the gathering storm. At length the heavy clouds discharge their con-

tents, and inundate the earth: the atmosphere seems an inexhaustible reservoir of water, while the brooks and rivers overflow their banks, and roll impetuously over the adjacent meadows.

However disagreeable and inconvenient this weather may appear, we must acknowledge it is ordained for wise and beneficent purposes. The earth, in a manner exhausted by its fruitfulness, has occasion to recover its strength, and for this end, it not only requires rest, but moisture also. The rain waters and revives the thirsty land, and penetrates to the lowest roots of the plants. The withered leaves, which covered the ground, now rot, and become excellent manure. And the heavy rains fill up the rivers anew, and furnish the springs with water. Nature is never idle. She is constantly employed, though her labours are sometimes concealed. The clouds, by pouring down a profusion of rain or snow, prepare the fertility of the ensuing year, and the riches of summer. And when the heat of the sun brings back the dry season, the ample springs which the winter rains had formed, diffuse their waters over the fields and valleys, and adorn them with new verdure. Thus, the infinitely wise Creator provides against the future; and what appears to us an evil, becomes the source of the beauties and treasures which spring and summer lavish on us. The gifts bestowed upon us, by these means, are as innumerable as the drops which fall from the clouds; and at the very time that blind and ignorant mortals are uttering loud complaints, instead

of presenting a tribute of praise, Eternal Wisdom invariably continues to complete its beneficent designs.

Our preservation is the principal end which God proposes in watering the earth with rain. But the Divine Wisdom knows how to unite different designs, and make them subordinate to each other; and from the proper combination of these, results the order and harmony of the universe. Thus, the animals which exist not only for mankind, but for themselves, requiring to be supported and fed, it is for them, as well as for us, that the rains descend from the clouds, and render the earth fruitful.

But here, as in every thing else, we discover the wisest economy. All the vapours and exhalations which daily rise from the earth are collected and preserved in the atmosphere, to be restored, either in the form of little drops, heavy rains, or flakes of snow, according to the occasion. Even the smallest sprinkling, the lightest fogs and dews, all contribute to make the earth fruitful. But in vain would the vapours rise, in vain would the clouds be formed, if nature had not furnished winds to break and to disperse them on all sides, to convey them from one place to another, and to water the ground where it requires moistening. Were not this the case, some districts would be deluged with perpetual showers, while others would experience all the horrors of drought. Trees, herbs, and corn, would also perish, if the winds did not drive the clouds to the places allotted for the reception of their watery con-

tents. God says, "Let there be snow on the earth," and it descends in flakes; and, when he says to the rain, "Fall thou upon the earth," it falls in showers, and waters the country. However inconvenient the rains of winter, or the uncomfortable temperature of this season may appear, they are, notwithstanding, absolutely necessary: so also are the dark and gloomy days of our lives. If we be desirous of bringing forth the fruit of good works, let us recollect, it is not necessary, for this purpose, that the sun of prosperity should continually shine upon us, or that we should be exempted from trials and afflictions. Let us, therefore, receive adversity from the hand of God with resignation; since all his dispensations are marked with infinite wisdom and goodness.

DECEMBER XIX.

Imaginary Influence of the Planets and Fixed Stars.

THE prodigious distance of the celestial bodies, and the little connexion that our globe has with them, scarcely permits us to think that they can have any sensible influence upon it. There are, however, many superstitious people who give implicit credit to such an influence, and affirm that there are continual emanations passing from the stars and planets, which act upon our atmosphere, and upon all terrestrial bodies. But what are these emanations? If by them be meant the proper

light of the stars, or the light of the sun reflected by the planets, it evidently comes to very little, and is much more inconsiderable than what the moon alone reflects upon us: therefore, as the light we receive from the moon has no sensible influence upon the earth, or the atmosphere, the light of the planets and fixed stars must have still less. If it were supposed that other matter issued from the stars, and reached us, it would be equally without foundation; for if these emanations were real, they would, when collected in a burning glass, produce some alteration or sensible change in terrestrial bodies; but this is refuted by experience. It is, therefore, evident, that nothing proceeds from the celestial bodies but the faint light they convey to us; or if any other emanations proceed from them, they must be such as pass through terrestrial bodies without causing the smallest derangement in their parts. Astrologers, therefore, whether they are weak enough to deceive themselves, or wish to impose on others, deserve nothing but contempt when they tell us of the benign influence of Jupiter, the malignancy of Saturn, the wit-inspiring power of Mercury, the warlike disposition produced by Mars, and the amorous influence of Venus.

The planets, far from producing individually those effects which astrologers have attributed to them, cannot have any influence even when taken collectively. What then shall we say of the rain-bringing Pleiades, the tempestuous Orion, the melancholy Hyades, the setting of Arcturus, and the rising of Capricorn, portending hail and tem-

pests? What influence can the constellation Taurus have on pease and beans? or that of the star Sirius in respect to the madness of dogs? Or what relation can subsist between Scorpio and the productions of harvest?

If the rising and setting of the different constellations were observed only as denoting the proper times for the various labours of agriculture, and not as the causes of natural things, it would be excusable. In the early ages of the world, the beginning, middle, and end of each season, was not marked by months, but by the rising and setting of the stars in conjunction with the sun, or by their immersion in, and emersion from, his rays. Hence proceeds the vulgar opinion, that the different aspects of those stars produced effects which, in reality, should only be imputed to the seasons, and consequently to the sun. Orion rises in autumn, and sets in winter, which has induced some people to suppose that he is the author of tempests; these, however, belong entirely to autumn and winter; whilst the rising and setting of Orion only mark the time of those seasons. When the dog-star rises with the sun, it is excessively hot in our zone, but that constellation is not the cause of it. These heats are occasioned by our sun being then at the highest. I say *our* sun; for in the opposite zone, when the dog-star rises with the sun, it is so extremely cold as to benumb animals, and to cover the rivers with ice; so that the southern nations consider this constellation as the cause of cold instead of heat. It is the same in respect to the Pleiades, which

are said to occasion rain; and all the other constellations to which effects have been attributed that really belong to the seasons in which these stars rise or set.

If, then, the planets and fixed stars have no part in the temperature and natural revolutions of our globe, they must have still less influence upon human actions. The happiness and misery of individuals, or of whole nations, depends partly on natural talents and passions, and partly on the combination of certain moral and natural circumstances; but the stars can have no influence upon any of these. If they had, we might be led to doubt the government of Providence, and to believe that the world is not governed by a Being infinitely wise, good, just, and powerful. And who would wish to inhabit a globe where all its revolutions depended on a blind chance, or on the influence of the stars, which must be fatal both to our natural and moral state!

Let us, therefore, leave to the superstitious a science so humiliating to the human mind, and so destructive to our peace, which, in reality, is only a wretched perversion of astronomy.

At the same time let us consider our wise and merciful Creator as the only foundation on which we may safely trust our present peace, and our eternal happiness.

DECEMBER XX.

The Polar Star.

None of the northern constellations are more remarkable than that which is nearest to the arctic pole, and is called the little bear. The extremity of its tail is but two degrees from the pole, and for that reason it is called the *polar star.* It may be easily distinguished from the contiguous stars, because it scarcely seems to change its position, and always occupies the same point in the heavens: for though it revolves round the pole, its motion is so slow, and the circle it describes so small, that it is scarcely perceptible. As it is therefore visible always in the same point of the firmament; it is a sure guide to the mariner, particularly in the open seas. Before the discovery of the compass, sailors had no other guide than the polar star; and even at this time, when the sky is serene, they may, on many occasions, better depend upon it than on the magnetic needle.

These observations should lead us to reflect upon that sure moral guide, which God has given us in his sacred Word; particularly in his Gospel, which points out the narrow path we ought to follow, and the true course we should steer while passing through the gloomy deserts, and the stormy ocean of this world, surrounded by clouds and darkness. Without this faithful guide we

should continually wander in uncertainty, and never find the road that terminates in the mansions of endless peace. It is in this blessed book of revelation alone that we find a certain and invariable rule, by which we may pursue with courage and alacrity the race that is set before us, and finish it with perfect joy.

What has been said respecting the polar star is also calculated to make us admire the goodness of God, who, by the situation and course of the stars, has given us a sure knowledge of times, places, and the different points of the heavens. An astronomer, though in an unknown country, can tell by the stars exactly where he is, and can ascertain the month, the day and hour, as correctly as if he had consulted the best watch. If, for example, we only observe that the stars come every day four minutes sooner to the place where they were the preceding evening, we consequently know that this will make two hours in each month. Thus, the star which we see this evening, the 20th of December, at ten o'clock, in a certain part of the heavens, will be seen on the 20th of January, exactly in the same place at eight o'clock. The star which is now at midnight to be seen over our heads, will a year hence be in the same spot again.

Let us here acknowledge God's tender mercies toward all the inhabitants of the earth. How much would those persons deserve pity who have neither clocks nor geographical maps, if they could not supply the want of them by the observation of the stars! If we put ourselves in the

place of those people, this reflection cannot appear indifferent; for we must be devoid of all the feelings of humanity, if objects which do not indeed directly concern us, but which interest so many of our fellow-creatures, should appear unworthy our attention. Let us look up with gratitude towards the Creator of all things. The use that the stars are of, in this respect, to mankind, is certainly one of the least advantages which result from the existence of those heavenly bodies; and yet this advantage alone merits our praise and thanksgiving. "The heavens, O God, are the work of thy hand: thou hast spread them out as a curtain, and made them the ceiling of thy imperial palace. The highest heaven is thy throne, and thou hast suspended the moon and stars in the regions of ether to illuminate our nights!"

DECEMBER XXI.

Effects of Air when confined in Bodies.

The effects of air when enclosed in bodies are very astonishing. The consequence of fluids freezing is universally known. Water in this state frequently breaks the vessels which contain it. And if a musket-barrel be filled with water, and its muzzle hermetically sealed, it bursts, when the cold is severe, with great violence. This at first view appears incomprehensible. We know

that water is not fluid of itself, but is made so by means of the heat which penetrates into every part of it; consequently it becomes a solid mass when it is deprived of the fiery particles, or when its motion ceases through excess of cold. It seems, as if the particles of water must draw closer, and condense, and of course that the frozen bodies should occupy less space than they did before: yet they certainly dilate, and their size increases by freezing, otherwise it would be impossible they should burst the vessels. Besides, how could the ice swim at top, if it did not increase in size, and thus become lighter than water?

What then is the cause of this effect? Is it the internal air? It is not the cold, for this is no real being, nor positive quality; and, properly speaking, it cannot penetrate into bodies. It is equally certain that heat is not the cause of this phenomenon. The air cannot insinuate itself into vessels of glass hermetically sealed, and yet ice forms within them. We must, therefore, seek the cause of it in the air which the water itself contains when thus shut up. To be convinced of this, we need only observe water beginning to freeze. The first coat of ice is scarcely formed, when the water begins to be agitated, and a number of little bubbles rises upon it: this upper crust of ice often rises up in the middle, and cracks; then the water rushes out at the opening, flies against the vessel, and while running down the sides it freezes. Hence it is, that towards the middle of the surface the water appears elevated and convex. These effects are produced by the internal air,

and would not take place, or but in a very small degree, if the air were exhausted as much as possible before the water began to freeze.

On this principle we may explain a variety of curious phenomena. Intense cold is very injurious to vegetables. We know that in all plants there is a circulation of the sap, which, though it thickens in autumn and winter, still continues fluid. An intense degree of cold converts it into ice, and, consequently, increases its volume; which cannot take place without causing many of the fibres and tubes of the plant to burst. In this case it is evident, that when the sap becomes liquefied in spring it cannot circulate properly; no more than the circulation of blood can be carried on in an animal whose veins are cut. Thus the growth of the plant is prevented, and it dies, because the nutritive juice can no longer flow through its vessels. Let us observe, however, that even this cold, which is prejudicial to plants, may, in some respects, become very useful to the earth. A field plowed before winter is better disposed to receive the autumnal rains, and to let them penetrate into it. If the frost succeed, the particles of the earth dilate and separate, and the spring then completes the softening of the earth; rendering it light, moveable, and fit to receive the benefit of the sun and the fine weather.

Enough has been said to convince us of the power of air, and of that expansive quality which is productive of so many advantages to our globe. The property this element has of condensing and rarefying so wonderfully, is the cause of the

greatest revolutions in the world. It is but in a very few cases that the power of this fluid can become injurious; and even then the evil is more than compensated by the advantages which result from it. But it must be confessed, that in this, as well as in every other phenomenon of nature, many things are completely inexplicable. All that we know of the nature, properties, and effects of air, is reduced in a great measure to probable conjectures, which will be verified perhaps in future, or possibly may be proved by those who come after us, to have been ill-judged mistakes. When, therefore, we contemplate the works of God in nature, we should be careful to do it in the spirit of humility, and diffidence of our own knowledge, always remembering the weakness of the human understanding, and the uncertainty of our opinions and systems. In any science, presumption is inexcusable; but when the knowledge of nature is in question, it becomes absolutely ridiculous.

DECEMBER XXII.

Music.

To music we are indebted for one of the purest and most refined pleasures we can possibly enjoy. It possesses the power of charming our ears, soothing our passions, affecting our hearts, and influencing our propensities. How often has it dissi-

pated the gloom of melancholy, animated the vital spirits, and ennobled our sentiments! An art so useful and pleasing is peculiarly deserving of our attention, and should induce us to employ it in glorifying our beneficent Creator.

But whence proceeds the impression which music makes upon our ears? It is an effect of the air, which receives an undulatory motion, and which strikes our auditory nerves in a variety of ways. When a tight cord is pulled, it changes its form; for its elasticity not only causes it to go back to its first place, but also to extend beyond it; and thus it continues vibrating back and forward till it recovers the state from which it was drawn. These vibrations communicate with the air, which conveys them to other contiguous bodies. Hence it is that, when an organ is played on, the strings of a lute, if near it, will be put in motion, and make a sound. But how are we to account for the difference of sounds? Why are some sharp and others flat? It is not the quantity of air put in motion; for a sound may be either sharp or flat, and at the same time weak or loud: neither can it be imputed to the swiftness of the undulations by which the sound is propagated in the air; for a sharp note does not pass more rapidly from one place to another than a flat. The difference proceeds, then, from the greater or less rapidity of the vibrations of the air. A sonorous body emits a sharp tone when the vibrations of its parts are very quick, and a flat one when they are slower. But why are certain sounds, when united together, harmonious and pleasing

to the ear, whilst others wound it by their discord? The only answer to this is, that the natural character of harmony consists in being in the same key; whereas in dissonance, the notes, though struck at the same time, disagree, and produce a double sound to the ear, which is very unpleasant.

But of what use would harmony be, if we could not distinguish it from discord? Let us therefore bless God for having enabled us to receive and distinguish the different impressions of sound, and for having given to our souls the power of associating certain ideas with corporeal sensations. How much gratitude is due to him for the many pure and innocent pleasures he has given us to enjoy! Let us express our sense of it by making use of music to glorify his name! Let us, in the most melodious sounds, lift up our hearts towards our great Benefactor, and celebrate his infinite goodness.

DECEMBER XXIII.

Comparison between Men and Animals.

In the comparison we are going to make between men and other animals, there will be found some things which are common to both: others in which the brute creation have an advantage over us; and, finally, some in which we are evidently superior.

The principal resemblance between men and brutes is, that both are material. We have, like them, life and organized bodies, which are produced by generation and birth, and supported by food. Both have also animal spirits, powers to fulfil the different functions assigned them: both have voluntary motions, and the free exercise of their limbs, senses, sensation, imagination, and memory. By means of the senses, both experience the sensations of pleasure and of pain, which cause them to desire certain things, and to reject others; both have a natural propensity to self-preservation and the propagation of their species; and both are equally liable to those general bodily accidents which the relation of things, the laws of motion, and the construction and organization of their bodies may occasion.

In respect to the happiness resulting from sensual pleasures, animals have many advantages. One of the chief is, that they do not require the clothing, defence, and conveniences which are necessary to men, nor are they obliged to invent, to learn, and exercise the arts necessary for these purposes. They bring with them into the world every thing they want, or at least they have only to follow the instinct which nature has implanted in them, to obtain all that can make them happy. This instinct never deceives them. And as soon as their appetites are satisfied, they are perfectly contented, they desire no more, and are never guilty of excess. They enjoy the present without troubling themselves about futurity; for there is every reason to believe that animals

have not the faculty of representing to themselves what may happen beyond the present moment. They never think of the morrow. Death itself comes upon them without having been foreseen, and without having been to them a cause of previous affliction.

In all these respects brutes may be said to have the advantage over human beings. Man is obliged to meditate, invent, labour, exercise himself, and receive instructions, or he would remain in a state of perpetual childhood, and could scarcely procure himself the necessaries of life. His instinct and passions are not sure guides to him; on the contrary, were he to abandon himself to them, he would soon become completely miserable. It is reason alone that constitutes the essential difference between him and brutes, supplies all his deficiencies, and, in other respects, gives him a decided superiority. By means of this faculty, he not only obtains every necessary and convenience, but is also enabled to multiply the pleasures of sense, to ennoble them, and to render them subservient to the best and greatest purposes. His soul enjoys delights unknown to the brute creation; pleasures which spring from science, wisdom, order, religion, and virtue, and which infinitely surpass all those of which the senses are the organs; because, in the first place, they tend to promote the perfection of human nature; secondly, they continually add to it; because they never forsake him, not even when his senses, deadened by sickness, old age, or any other circumstances,

become insensible to all animal enjoyments; and thirdly, they conform him more and more to the mind and will of God: whilst, on the contrary, the more a man abandons himself to mere sensual gratifications, the more he degrades himself to the likeness of a brute.

We may add, that the sphere in which animals are permitted to move, is very confined, their desires and propensities are few, and their pleasures but little diversified; while those of man are infinitely varied. He can press almost every thing into his service, and knows how to make every article useful in one way or other. He continually makes new discoveries, acquires further light, and makes a rapid progress in the road to perfection and happiness; whereas the brutes, always confined within their narrow limits, never invent nor improve any thing; but always continue at the same point, and never rise by industry or ingenuity, above animals of the same species.

Hence we may conclude, that it is reason alone which gives us a superiority over the brute creation; and in this the chief excellence of human nature consists. To make use of our reason in order to ennoble the pleasures of sense, and to enjoy more and more those that are intellectual, so as to improve daily in wisdom and virtue, is the distinguishing characteristic of man. This is the end for which he was created. Let it then be our constant study to answer this purpose; for we can only be happy in proportion as we

follow what reason and revelation point out to us as useful and right.

DECEMBER XXIV.

Calculation concerning the Resurrection.

With what a crowd of human creatures must a single city be filled at the great day of resurrection! What prodigious multitudes will be spread over the whole earth! prodigious indeed, but not innumerable. For each of the dead is known unto the Lord, the name ofeach is entered in the eternal register; all must appear before the judgement-seat, and none can escape the all-seeing eye of God.

Supposing that Germany began to be peopled five hundred years after the general deluge, that is, about four thousand five hundred years ago; and that from the foundation of the city of Hamburgh to the day of judgement, supposing it were to happen at the present period, there have only been two hundred persons buried annually, reckoning one year with another, the number of deaths would amount to nine hundred thousand. If then a single city should yield so many at the day of judgement, how many must the whole empire of Germany produce? Computing the population at twenty-four millions, the city of Hamburgh could not be estimated to contain more than the three thousandth part of the inhabitants.

According to this calculation we may suppose that Germany will produce two thousand one hundred millions. This number is certainly prodigious, and yet what is it in comparison with what the whole earth contains, which is reckoned to be at present a thousand millions! If we fix it at this number and calculate it as above, the total of those who have died, during the above-mentioned space, must amount to eighty-seven thousand five hundred millions. If we afterwards add to it those who lived before the flood, and those who died after it, in the space of five hundred years, a number which may be reckoned at a quarter of the preceding, we shall then have a total of one hundred and nine thousand three hundred and seventy-five millions. Lastly, let us add the number of people that may be alive at the day of judgement, and only fix the number as before at one thousand millions, and the whole will amount to one hundred and ten thousand three hundred and seventy-five millions!

Let us figure to ourselves this prodigious multitude which must appear before the Judge of the world. How great must HE be who can scrutinize the most secret thoughts of each individual, of which such an infinite number is composed; who is intimately acquainted with all their thoughts, words, and deeds; who perfectly remembers the day of their birth, the duration of their life, and the time, manner and circumstances of their death; who will be able to distinguish the scattered atoms of each, and to

collect them together: whether their bodies had been reduced to ashes, dissolved into millions of particles, or had undergone innumerable transformations. What a work of Omnipotence to collect these earthly atoms, to purify, to ennoble, and to form them for immortality!

DECEMBER XXV.

Thoughts on the Nativity of Christ.

When I consider that this day is set apart for the celebration of Christ's nativity, my soul expands with sentiments of holy joy and gratitude; but when I reflect on the circumstances which accompanied this great event, I am completely overwhelmed with astonishment! I behold a Son of man in the lowest state of humiliation; and this Son of man is my God! I behold the mighty, the invisible God, at whose word the heavens and the earth were made, and by whose command they shall be destroyed; and I behold at the same time, a visible being, weak, and clothed in flesh as I am! How wonderful is this union, the King of kings, whom angels adore, appearing under the form of a servant! A child, weak, destitute, and shedding tears, lying in a manger! What astonishing humiliation! Human nature, so limited, so corrupted, raised by Jesus Christ to an eternal throne of glory! What a miraculous change! But can I well compre-

hend the greatness of this Divine mercy? Or rather, do not the astonishment and admiration with which it inspires me doubly increase, when I reflect on my own unworthiness, and the infinite majesty of my Redeemer? Certainly it was a love which infinitely surpasses all I can merit; a love beyond all I could conceive or hope; a love which I have only silently to admire and adore.

But if my sense of this goodness be great, my joy and hope are not less so. In this union of God and man, I behold the joyful emblem of the new covenant. Faithful to his promises, God has sent his Son into the world, that through him we may have eternal life; and have we not assurance, that all which was promised in his name shall be accomplished with equal fidelity? Christ would never have honoured our nature so as to unite it with his own, had he not resolved to heal our infirmities, to pardon our sins, to wipe out our stains, and thus to restore our nature to its original purity and innocence.

What then can be more just and natural than to give ourselves up entirely, on this solemn day, to sentiments of pious gratitude? It is true, we can never make a return for the inestimable love of God our Saviour; but let us exert all our powers to evince the sincerity of our gratitude, and the fervour of our affection. This tribute, however unworthy in itself, will be well pleasing in his sight. Such are the sentiments with which we ought to celebrate this solemn festival. Let not our admiration be the fruit of ignorance, but

of an enlightened conviction; neither let our hope be the effect of a blind persuasion. If it be the work of a pure faith, what a sweet consolation, what heavenly joy, will fill our hearts! it will enable us to support every thing in life, because it is a felicity which nothing can destroy.

DECEMBER XXVI.

The Place of our Saviour's Nativity.

It seems at first sight to be of little consequence to know the place of Christ's nativity; for we should consider him as our Redeemer, whatever might have been the circumstances which attended his mortal life. But since it pleased God to declare the place in which the Saviour of the world should be born, it became necessary that it should happen precisely in the appointed place, and that this should be one of the characteristics by which Jesus Christ should be known to be the true Messiah.

It is also of little importance to us in what place we ourselves live, provided we find true happiness. There is no place upon the earth, however poor and despicable, that may not contain better and happier people than some of the greatest and most celebrated cities. Do we know a single spot of our globe where the works of God do not exhibit themselves under a thousand

striking forms, and where a person might not experience the sweet satisfaction which results from a well-spent life? For each individual, the place preferable to all others, is that in which he may enjoy the best state of health, and do the most good. For a number of people that place is best which contains the greatest number of wise and virtuous men; for every nation declines in proportion as religion and virtue lose their influence.

The place where a young man, for the first time, contemplated the morning dawn and the renewed beauty of nature with the most lively sensations of pleasure, love, and veneration; the place where a virtuous pair first became acquainted, or where two friends gave each other the noblest and most affecting proofs of tenderness; the village where any one may have seen or given remarkable proofs of goodness, justice, and patience; such a place must assuredly be dear to the heart.

According to this rule, Bethlehem, though small, was a venerable place; since it contained a considerable number of pious people, and many singular acts of piety had often been performed in it. There the patriarch Jacob staid some time, in order to erect a monument for his beloved Rachel. It was at Bethlehem, that the worthy Naomi, and her modest daughter-in-law, Ruth, gave proofs of their faith and virtue. And it was there Boaz, that generous benefactor, lived and had his possessions. Bethlehem was the abode of the humble Jesse, the happy father of so

many sons, the youngest of whom rose from the state of a shepherd to the throne of Israel.

It was there David formed a resolution of building a temple for the Lord; and showed himself the true shepherd and father of his people, when, at the sight of the destroying angel, whose sword spread terror and death around, he made intercession for the unhappy sufferers. At Bethlehem was born the prince Zerubbabel, a descendant of David, and the type of that Ruler and Shepherd under whose government Israel is one day to assemble, in order to enjoy uninterrupted happiness. Lastly, this city was honoured by the appearance of the Son of God, whose birth laid the foundation for our redemption. Thus, in places too small to be remarkable, men are sometimes born who afterwards become the benefactors of mankind. Even an inconsiderable village often produces a man who, by his wisdom, uprightness, and heroism, becomes a blessing to whole kingdoms.

It is our duty and privilege, whether our lot be cast in cities or in villages, so to live that the great end for which our Saviour was born may be accomplished in us. It is certain that true piety would make a rapid progress over the earth, if men every where endeavoured to give proofs of innocent morals, and fervent faith. If our cities furnished more examples of virtue, their influence would extend to the country; and in the smallest village there might be found families who, like that of Joseph and Mary, would distinguish themselves by their uprightness and piety,

and would attract respect even in the midst of poverty and humiliation. Then would God shed blessings over the country of these good people; and, after some generations, we might hope to see a people formed, full of the fear of the Lord, and diligently walking in his ways.

He who has travelled most over the world, who has visited royal cities, and witnessed the various crimes committed there, has abundant cause when, at least, he finds some town or village, where, in a peaceful cot, surrounded with quiet neighbours, he may devote himself to the service of God and humanity, and by these means enjoy that sweet contentment which arises from tranquillity and peace of mind? He will not then regret places, more magnificent indeed, but where luxury spreads many snares; more extensive, but where vice is triumphant; more rich, but where men live in a forgetfulness of God and their duties. To all these he will prefer the obscure retreat where, secure from bitter remorse, he may live tranquil and happy.

DECEMBER XXVII.

Care which God takes of Men from their Birth.

How numerous were our wants even at the moment of our birth! It was with pain, and through the assistance of others, that we were brought into the world, and we should soon have lost the breath

we had but just begun to respire, had not a variety of things relative to our clothing and nourishment been previously prepared; and had we not found persons who condescended to take care of us in our weak and helpless state; or rather if our Heavenly Father himself had not watched over our preservation. He took care of us whilst we were yet in the womb, when no human wisdom or industry could have assisted us. His divine hands fashioned, arranged, and connected all our members. He gave to every vein its particular direction, and filled them all with the vital fluid. He clothed us with flesh and skin; gave us bones and sinews; and by diffusing through all these a rational and intelligent spirit, he formed a creature worthy of bearing his own divine image.

The same merciful Providence which watched over us at the time of our birth has never abandoned us, but has constantly appeared on our behalf till the present period. It should also be recollected, that at the moment of our entrance into life our God laid the foundation of our future happiness. Weak and helpless of ourselves we neither did nor could know what our fate would be; but all was perfectly known to God. He saw the whole of our lives; all the contingencies and future events, with their consequences and connexions. He knew what would be best for us, and regulated our state accordingly; and, at the same time, determined on the means he would employ to procure us the best of blessings. From our very birth, the causes existed which were to influence our future happiness, and they

already began to act conformably to his views. How much does the happiness or misery of life depend on our parents, their opinions and situation in life! How much our early education, the examples set before us, the connexions we formed, and the opportunities which occurred of exercising our powers and talents, must influence the happiness of our lives! We have reason, therefore, to bless our God that his wisdom and goodness ordered all these things, which have proved so advantageous to us. It was he who watched over our happiness, and who in his great goodness directed all events which might prove favourable or unfavourable. He foresaw and appointed every thing, and all his dispensations toward us were replete with wisdom and mercy. He knew what adversities would be beneficial to us, and appointed their sources, their commencement, the exact time of their termination, and the advantages we should derive from them. These causes acted for some time in secret; but by degrees they were developed, and in many instances we have been compelled to acknowledge, that distresses and sorrows were necessary to our real happiness. But they would not have had such salutary effects, without the concurrence of many causes which acted remotely a long time before, and were unknown to us.

These reflections should inspire our minds with firm and tranquil hope. What can be more comfortable, than the conviction that an Invisible Being constantly protects us? a Being infinitely good, wise, and powerful, who watched over us even in

our mother's womb; who, from that moment, settled every thing necessary for our future lives; who has reckoned our days, and appointed a term for them, which no human power can change; who has ordered all for our temporal and eternal happiness? Surely the peace and confidence which rest on such a basis must be immoveable!

DECEMBER XXVIII.

Term of Human Life.

EVERY man dies precisely at the time that God in his infinite wisdom has appointed; and as the time of our birth is fixed, so also is that of our death. But the term of human life does not depend on inevitable fate. There is no such thing in the world. Every thing that occurs might happen sooner or later, or even not at all. It might always be possible, that the man who died to-day might have died sooner, or lived longer. God has not fixed the days of man by an absolute and arbitrary decree, or without respect to circumstances. He is an infinitely wise Being, who does nothing without motives worthy of himself. He must, therefore, have had just reasons for decreeing that such a person should quit the world at one time rather than at another. But though the term of life be neither from necessity nor fatality, it is not the less certain, and is never in reality changed.

When a man dies, there are always causes

which infallibly bring on his death, unless prevented by a superior power. One person dies of a mortal disease, another by a sudden and unforeseen accident. Some perish by fire, others by water. God foresees all these causes. He is not an idle, indifferent spectator of them. He examines all with care; he compares them with his designs, and sees whether he approves them or not. What he approves, he determines accordingly; and there exists a divine decree, by virtue of which the man dies at such a time, or by such an accident. This decree cannot be revoked nor prevented, because the same reason which God has at present for taking a man out of the world was known to him from all eternity: he judged of it then as he does now; and of course nothing can induce him to alter his purpose.

But it is possible that God might not approve the causes of a man's death when he foresaw them. In this case, he determined at least to permit them. But if God resolves to permit those causes of death, it is his will that we should die at the time in which the causes existed. It is possible that he might have been inclined to grant an individual a longer period, and did not approve the causes of his death; but it was not consistent with his wisdom to oppose them. He sees the universe in the whole, and finds reasons which engage him to permit men to die at such a time, although he neither approves the causes, manner, nor circumstances of their death. His wisdom finds means to direct these deaths to useful purposes; or else he foresees, that longer lives,

under their circumstances, could neither be beneficial to themselves, nor to the world; or possibly he finds, that in order to prevent these deaths, it would require a new combination of things, such as would not agree with the general plan of the universe. In a word, though God sometimes disapproves the causes of a man's death, he has always just and wise reasons for permitting them, and for decreeing, consequently, that the man should die at such a time, and in such a manner.

These considerations should teach us to contemplate death with Christian fortitude and tranquillity. What principally renders it so terrible, is the uncertainty of its approach, and the manner in which it may seize us. If we know beforehand when and how we should die, we might probably await the awful hour with some degree of resolution. Now, nothing can more effectually encourage and calm our minds in this respect, than the persuasion that Divine Providence watches over us, who, from the foundation of the world, decreed, with infinite wisdom and goodness, the time, manner, and every circumstance, of our death. The term of our lives is appointed, and no man can die sooner or later than God has decreed, for the good even of the person himself. Persuaded of this comfortable truth, we may calmly expect the hour of death; and since it is uncertain, let us be prudently prepared to meet it at any time. Most certainly it will not come till God thinks proper. We are ignorant, indeed, of what kind of death it may

be; but it is sufficient to know, that we can only die in the way that the Merciful Ruler of the world judges best for us, and for those belonging to us. Supported by this thought, let us continue our earthly pilgrimage without anxiety; let us cheerfully submit to the dispensations of Providence, and never fear any dangers to which the performance of our duty may expose us.

DECEMBER XXIX.

Instability of Earthly Things.

THERE is nothing in nature that is not liable to change. Nothing is so durable as always to retain its present appearance. Every thing is uncertain and frail. The most solid bodies are not so impenetrable, nor their parts so closely united, as to preserve them from dissolution. Each particle of matter insensibly changes its form. How many changes have our bodies undergone since their formation in the womb! We annually lose some of our constituent parts, and again acquire new ones, from the animal, vegetable, or mineral kingdom. Every thing on earth alternately increases and decreases; but with this difference, that the changes do not operate so quickly in some bodies as in others.

The celestial globes appear to be still the same as at the moment of their creation; and they are, perhaps, the most invariable of all bodies. Accurate observers, however, perceive that some

stars have disappeared, and that the sun has spots which change, and thus they prove that even that luminary is not constantly the same. Its motion also makes it liable to variation; and though it is never extinguished, it has been often obscured by fogs, clouds, and, perhaps, by internal revolutions. This is all we can know of it at such an immeasurable distance: but were we nearer we might probably discover many more external and internal changes. If we are more forcibly struck with the instability of earthly things, it is because they are within our view. And how frail are these! how liable to change! Each object continues to look like itself, and yet how different is it in reality from what it originally was! We daily behold things assuming new forms; some growing, while others are diminishing and perishing.

This year, which in two days will be at an end, affords undeniable proofs of these assertions. Each person, in his own little circle, must have experienced many vicissitudes. Several of those whom we have known for many years are no more. Many whom we have seen in affluence are become poor, or at least are but in an indifferent situation. If we examine ourselves also, we shall find a difference in many respects. Are not our health and activity diminished? And are not all these things warnings of approaching towards that great and final revolution which death will occasion? Besides, many changes may still happen in the two remaining days of this year. We may become poor or sick; we may experience the in-

fidelity of friends, or even die, in that space of time.

Such reflections must inevitably oppress and sink us to despair, if religion were not our support and consolation. But this leads us to the only invariable, and eternal Being, whose very nature is immutable, and whose mercy has no end. Full of confidence, therefore, in his unchangeable goodness, let us submit with resignation to all the changes of this transitory world.

DECEMBER XXX.

Retrospect of past Time.

The approaching close of the year leads to reflections which, however important in themselves, do not always excite the attention. In order to feel more sensibly how short the course of life is, I will now examine the use I have made of the past days; though I have reason to believe it will prove a subject of humiliation.

I first recall to myself those days it was not in my power to command. How much of this year has been passed in eating, drinking, and sleeping; in caring for the body, and providing for its various necessities! How much time has been spent in useless occupations, or, at least, in such as were of no benefit to our souls! And how many hours have rolled away in uncertainty and in-

action, in perplexity and anxious expectation! Thus when I even slightly review the days of this year, I find that a vast number have been unproductive of any intellectual good, and that very few remain which have been employed for the purpose of real life. Out of three hundred and sixty-five days, there are scarcely fifty of which I can say, "These are my own," as having conduced to my eternal happiness. And even of these few remaining days, how many hours have been lost by my folly or frailty! How much time has been sacrificed to vice, and sullied by sin! How humiliating is the thought, how well adapted to cover a sinner with confusion!

Perhaps many of those days granted me for reflection have been devoted to the world, to vanity, to idleness, and false pleasures. Perhaps they may have been profaned by impurity, envy, jealousy, slander, and other vices, which betray a heart void of respect for God, and charity to mankind. Even since God has inspired me with a desire to walk in his paths, how much time has been irrecoverably lost in thoughtlessness, indifference, doubts, anxiety, want of temper, and all those infirmities which are the effects of frailty, and the weakness of human reason! Lastly, how swiftly does the little space of time we can dispose of fly away! A year passes almost insensibly, and yet it is of prodigious consequence to a being whose life is reckoned by hours. When we recollect how little of it we have spent suitably to the purposes of our creation, we wish to recall

those hours which have been so ill employed. But this desire is fruitless. The year, with the good and bad actions which have marked it, is swallowed up in eternity.

O merciful Father! forgive us the faults we have had the misfortune to commit; and grant us thy mercy in the hour of death, at the day of judgement, and through all eternity.

DECEMBER XXXI.

Hymn of Praise at the Close of the Year.

INFINITE Jehovah! thou art the God of time and of eternity. Deign to attune my tongue, and listen to my feeble accents, while I sing a joyous hymn to celebrate thy holy name. A year is completing its appointed revolution; and to thy grace and paternal love I am indebted for the continuation of my existence!

Being of beings, receive the homage of my soul! Thy nature is immutable; for thou hast been, thou art, and thou shalt be, through the countless ages of eternity! Thy faithfulness endures from generation to generation, and every morning brings a renewal of thy tender mercies!

Thou hast led me, by thy paternal hand, through the year which is now ending: when my heart was lacerated by anxiety and distress, thy merciful interference afforded me relief and consola-

tion. I will praise thee, O God! I will exalt thee with all my powers of soul and tongue; and again commit myself to thy unerring guidance, and unfailing support.

Vouchsafe, O God, to pardon the innumerable offences which I have committed against thy divine majesty in the days that are past. And, for the sake of thy dear Son, let me again experience thy fatherly support. Teach me to do thy will, and enable me to please thee as long as I live!

Inspire my soul with new zeal, and grant me a renovation of strength, that I may walk before thee in the paths of righteousness. Quicken and sanctify my heart by thy blessed Spirit, that, being detached from the world, and inflamed with holy love, it may ever be united unto thee, O thou source of endless felicity!

The world passes away, and its enjoyments are constantly and rapidly dispersing: it is not in these, therefore, that I must seek for happiness. Even in this sublunary state, I may aspire to nobler joys. I am related to angels, and heaven is my patrimony. Grant, O God, that I may incessantly aspire after it!

Teach me, in future, O Lord, to redeem my time, and to walk with holy circumspection in the narrow path that leads to eternity! Mercifully deign to alleviate the burthen of life, till I attain the happy period in which all my labours shall cease, and my repose shall be interrupted no more!

FINIS.

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